

حمل الآن

مجاناً وحصرياً

المراجعة رقم (1)

اختبار شهر ابريل



1 [A] Choose the correct answer :

1 Mark

At the mid-point of the vertical distance between the point of falling a ball and the ground surface, the ratio between the kinetic energy and the potential energy is

- (a) 0 (b) 1 : 1 (c) 1 : 2 (d) 2 : 1

[B] (1) State :

2 Marks

1- The energy conversions in the demolition ball.

*

2- Factors affecting the kinetic energy.

*

(2) Give reason : Despite the increase in the potential energy of an object thrown vertically upwards, its mechanical energy remains constant.

1 Mark

*

.....

2 [A] Complete the following sentence :

1 Mark

An object its mass is 2 kg moves in a speed of 10 m/s, its kinetic energy equals J, when its speed is doubled, its kinetic energy becomes J

[B] 5 kg object is placed at 5 m height above the ground, its kinetic energy equals 60 J [Earth's gravitational field intensity = 10 N/kg]

2 Marks

Calculate :

(1) Its potential energy.

*
.....

(2) Its mechanical energy.

*
.....

3 [A] Correct the underlined parts in the following :

1 Mark

If the speed of an object decreases to its half and its mass increases to the double, its kinetic energy increases to the double. (.....)

[B] (1) What is the meaning of that the kinetic energy of an object its mass is 10 kg equals zero ?

1 Mark

*
.....

(2) What happens when : A pendulum ball passes through its original position during its motion «In relation to : The potential energy and the kinetic energy».

1 Mark

*
.....

1 [A] Choose the correct answer:

The animals which feed on both plants and animals are known as

- (a) carnivores. (b) omnivores. (c) herbivores. (d) predators.

1 Mark

[B] Give reasons for the following:

(1) The scavengers cannot be primary consumers.

*

(2) The algae are autotrophic organisms.

*

(3) The ladybugs are used in the biological control.

*

3 Marks

2 [A] Mark (✓) or (X) for this statement, with correction if needed:

Dionaea plant is a predator.

()

1 Mark

[B] (1) How much energy does reach the 4th level, if the energy in the first level was 30000 energy units? How much energy is lost?

1 Mark

*

(2) Study the shown energy pyramid,

then replace the numbers with

the following organisms :

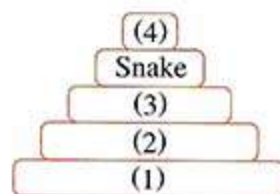
(Weasel - Corn grains - Snake - Owl - Chicks)

(1)

(2)

(3)

(4)



1 Mark

3 [A] Complete the sentence:

1 Mark

..... and are of the patterns of the nutritional relationships.

[B] (1) Compare between:

1 Mark

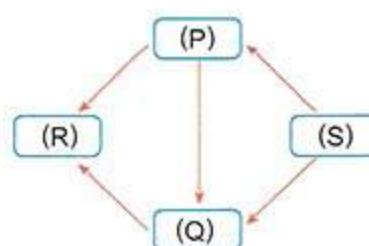
Food chain and food web (Definition).

*

(2) The given diagram shows a food web, Identify the letter which represents:

1 Mark

- 1- The organism which occupies the top of each food chain. (.....)
- 2- The organism which obtains its energy from the sun directly. (.....)



Test 3

Lesson Two Genetic Traits and Mutations

10 Marks

1 [A] Choose the correct answer :

1 Mark

Number of the chromosomes in the human liver cell is chromosome.

- (a) 20 (b) 23
(c) 32 (d) 46

[B] (1) Mention a beneficial mutation related to reducing electricity consumption with stating whether it is induced or spontaneous.

1 Mark

*

(2) According to the following statement:

2 Marks

Some strawberries are characterized by unusual large size.

- 1- State one reason for the occurrence of mutations.

*

- 2- What are the components of the mixture of separating the strawberry chromosome?

*

2 [A] Identify the odd item, then state the connection between the others:

1 Mark

Wheat resistant to rust / Huge cows / Light-skinned persons / Seedless lemon.

* /

[B] Give reasons for the following:

2 Marks

(1) The curling up of a hedgehog at sensing danger is an instinctive behaviour.

*

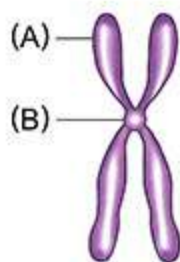
(2) The computer skills are not genetic traits.

*

3 [A] Complete the sentence:

In the figure, the letter (A) refers to,

while the letter (B) refers to



1 Mark

[B] (1) What happens when a child who suffers from

lactose intolerance drinks milk?

*

1 Mark

(2) What is the hypothesis of the scientists Beadle and Tatum?

Write its statement.

*

1 Mark

**Question 1** 6 Marks**[A] Choose the correct answer:**

2 Marks

(1) All the following organisms are consumers, except

- (a) rabbit. (b) fish.
(c) algae. (d) snake.

(2) Cubic-shaped watermelon is produced through

- (a) an induced mutation. (b) an agriculture technique.
(c) genetic traits. (d) genetic engineering.

[B] Give reasons for the following:

4 Marks

(1) Cockroaches are scavengers.

*
.....
.....

(2) The resistance of wheat plant to rust disease is an induced mutation.

*
.....
.....

(3) Each gene is responsible for a specific hereditary trait.

*
.....
.....

(4) Energy decreases upon transferring from one living organism to another through energy pyramid.

*
.....
.....

Question 2 6 Marks

2 Marks

[A] Write the term (name) of:

- (1) The place where the genetic material of the prokaryotes is found. (.....)
- (2) An organism that feeds on aphid insects which harm the vegetables and fruits. (.....)

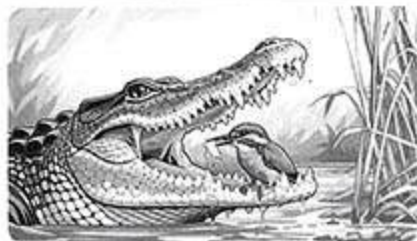
[B] (1) Study the figures carefully, then answer the questions:

2 Marks



- 1- **What** is this nutritional relationship?
Which organism is harmed?

*



- 2- **What** is this nutritional relationship?
Which organism is the beneficiary?

*

(2) State the importance of :

2 Marks

- 1- Chromosomes.

*

- 2- Induced mutations in agriculture.

*

Question 3 6 Marks

2 Marks

[A] Identify the odd item in each list, then state the connection between the others:

- (1) Hyenas / Bears / Ravens / Hedgehogs.

*

- (2) Facial freckles / Curly hair / Giraffe's long neck / Bat sleeping upside down.

*

[B] (1) What are the results of:

2 Marks

- 1- The absence of mice from this desert food chain:

Grass → Locust → Mice → Snakes → Hawks.

*

- 2- The presence of nodular bacteria on the roots of bean plants.

*

(2) What is meant by:

1- Instinctive behaviours.

*

2- Species.

*

2 Marks

Question 4 6 Marks

[A] Mention one example for:

(1) Beneficial mutation.

*

(2) Predator plant.

*

2 Marks

[B] (1) If the energy of the primary consumer in a food chain is 200 energy units, so how much is the energy of the producer?

1 Mark

*

(2) State one difference between:

1- The biotic population and the biological community.

*

2- Producers and decomposers.

*

2 Marks

(3) State the contribution of the scientists Beadle and Tatum to the science.

1 Mark

*

Exam Model 2



ON UNIT 3

24 Marks

Question 1 6 Marks

[A] Write the scientific term of each of the following:

2 Marks

(1) The nutritional relationship between *Dionaea* plant and an insect. (.....)

(2) A group of individuals of the same species living in a particular space at the same time. (.....)

[B] Compare between:

4 Marks

(1) Production of featherless chicken and the birth of an albino infant.

"In terms of : Type of mutation".

*

(2) Prokaryotes and eukaryotes. "In terms of : Where the chromosomes are found".

*
.....

(3) Rabbit and bear "In terms of : Type of consumer".

*
.....

(4) The producers and the consumers.

*
.....

Question 2 6 Marks

[A] Complete the following sentences:

2 Marks

- (1) The relationship between two lions hunting the same gazelle is, while the relationship between the root nodular bacteria and the bean plants is
- (2) Among the abiotic components in an ecosystem are and

[B] (1) The figure shows a shape of watermelon fruit:

1- Does the figure illustrate a mutation? Give reason.

*

2- Mention the way of production of the watermelon fruit in this shape.

*



2 Marks

(2) What is meant by the biological control?

*
.....

1 Mark

(3) How much energy will transfer to the primary consumer, if the producer owns 1000 energy units?

*
.....

1 Mark

Question 3 6 Marks

[A] Mention one example for:

(1) Instinctive behaviour.

*

(2) Scavenger.

*

2 Marks

[B] Give reasons for the following:

4 Marks

(1) Most of the carnivores have sharp canines.

*
.....

(2) Riding bicycles is an acquired trait.

*
.....

(3) Some persons have six fingers on hand.

*
.....

(4) Decomposers have an important role in maintaining the ecological balance.

*
.....

Question 4 6 Marks

[A] Choose the correct answer:

2 Marks

(1) Which of the following organisms occupies the first trophic level in a food chain?

- (a) Frog. (b) Grasses. (c) Locust. (d) Hawk.

(2) Each of the following is a genetic trait, except

- (a) skin colour. (b) eye colour.
(c) learning walking. (d) giraffe's long neck.

[B] (1) Construct a food chain using the organisms below:

(Crustacean animal / Seal / Fish / Polar bear / Algae)

1 Mark

*

(2) What happens when:

1- The producer is removed from a food chain.

*

2- A child is born with lactose intolerance mutation.

*

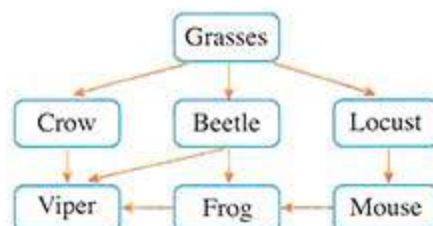
(3) In the shown food web:

How many food chains do form this web?

Identify the second consumer(s)

and the tertiary consumer(s).

*
.....



1 Mark

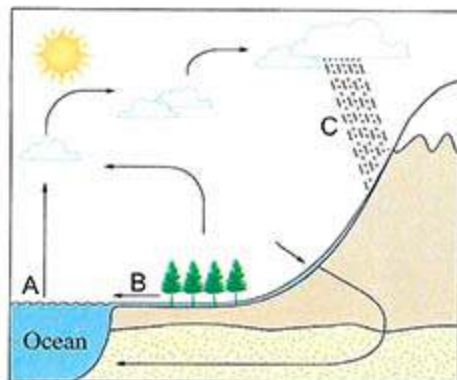
- 1 [A] **Choose:** Water transfers from the soil to the atmosphere through the plants in a process called

1 Mark

- (a) infiltration. (b) condensation.
(c) transpiration. (d) precipitation.

- [B] The diagram illustrates the water cycle in nature,

Answer the following:



3 Marks

- (1) What are the processes indicated by the letters (A) and (B)?

- * (A) :
* (B) :

- (2) What is the force which causes the process (C)?

- *
.....

- (3) Give reason: Wind plays an important role in the water cycle.

- *
.....
.....

- 2 [A] **Correct the underlined part:**

1 Mark

Water comprises around 97% of the Earth's surface composition. (.....)

- [B] (1) **What are the results of :**

1 Mark

The decrease in the temperature of the clouds less than that of the freezing point of water.

- *
.....

- (2) **What is the concept on** which the seawater desalination relies ?

1 Mark

- *
.....

- 3 [A] **Complete:** Melting process is the reverse of the process, while the process is the reverse of condensation process.

1 Mark

[B] Compare between:

2 Marks

(1) Tropical regions **and** polar regions

"In terms of : The effect of the Sun on the evaporation".

*

(2) Precipitation **and** surface run-off **"In terms of : Definition".**

*

كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9



حمل الآن

مجاناً وحصرياً

المراجعة رقم (2)

اختبار شهر ابريل



Lesson Two

Kinetic energy

Weeks 7, 8

Class performance Date: / / , Date: / /

- 1- The kinetic energy of a train differs from that of a truck. Which one has greater kinetic energy?

Explain train bec it has larger mass

- 2- The kinetic energy of the blue car is greater than that of the other vehicles.

Explain bec it moves with high speed



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- The kinetic energy is define as energy acquired by object due to its motion and its measuring unit isJoule
- The kinetic energy of an object can be determined from the mathematical relationship $K.E = 1/2 M \times V^2$
- The mass of a body is directly proportional to its kinetic energy. Therefore, if the mass of a body is less than half , its kinetic energy isdecreases to half
- The speed of a body is directly proportional to its kinetic energy. Therefore, if the speed of a body doubles, its kinetic energyincreases 4 times.

Using the textbook and in light of your studied , define the following :

kinetic energy

energy acquired by object due to its motion
work done during motion of an object

Homework week (7)

What is meant by: Kinetic energy work done during motion of an object is 250 J

What does it mean that: The kinetic energy of an object is 250J .

P.E : energy stored in object due to work done on it . $P.E = W \times h$

Compare: Kinetic energy and potential energy in terms of: $K.E = 1/2 M \times V^2$

Definition – Mathematical relationship – Influencing factors .

What happens when:

- 1- The speed of a moving object doubles while its mass remains constant, in relation to its kinetic energy increases 4 times
- 2- The mass doubles and the speed less than half, in relation to kinetic energy decreases to its half
- 3- Two cars (1 and 2) with the same mass move at two different speeds, in relation to kinetic energy moves with more speed has more K.E

Problems

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$$0.5 \times 1000 = 500 \text{ j}$$

1- Calculate the mass of an object whose kinetic energy is (0.5 kJ) and whose speed is (5 m/s). $M = 2K.E / V^2 = 2 \times 500 / (5)^2 = 40 \text{ Kg}$

2- Calculate the speed of a ball with a mass of (600 g) and kinetic energy of (100 J). $V = \sqrt{2K.E / M} = \sqrt{2 \times 100 / 0.6} = 18.25 \text{ m/s}$ $M 600/1000 = 0.6 \text{ Kg}$

3- An object with a mass of (8 kg) moves at a speed of (4 m/s). Calculate the kinetic energy of the object if its mass doubles while its speed remains constant. $K.E = 1/2 M \times V^2 = 1/2 \times 16 \times (4)^2 = 128 \text{ j}$ $M 8 \text{ double } 16$

4- An object with a mass of (10 kg) moves at a speed of (3 m/s). Calculate the kinetic energy if its speed doubles while its mass remains constant.

Weekly assessment

Week 7

$$v 3 \text{ double } 6$$

$$1/2 \times 10 \times 6^2 = 180 \text{ j}$$

Complete the following statements

1- Factors affecting the kinetic energy of a body Mass..... and velocity.....

2- The unit of measurement for kinetic energy is joule..... and is equal to Kg..... $\times$ M/sec.....

3- The kinetic energy of a body = $1/2 M$ $\times$ V^2

4- Kinetic energy is directly proportional to the mass and velocity.....

5- The greater the mass of a body, decrease the speed of the body when the kinetic energy is constant.

6- When the speed of a body increases three times, its kinetic energy increases 9..... times its original value.

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Problems

1- Calculate the kinetic energy of a ball with a mass of (20 kg) moving at a speed of (4 m/s). $K.E = 1/2 M \times V^2 = 1/2 \times 20 \times 4^2 = 160 \text{ J}$

2- Calculate the kinetic energy of an object with a weight of (20 N) moving at a speed of (6 m/s). $M = W/10 = 20/10 = 2 \text{ Kg}$ $K.E = 1/2 M \times V^2 = 1/2 \times 2 \times 6^2 = 36 \text{ J}$

3- Calculate the kinetic energy of an object with a mass of 500 g covering a distance of 20 m in 4 s. $M = 500 \text{ g} / 1000 = 0.5 \text{ kg}$ $K.E = 1/2 \times 0.5 \times 5^2 = 6.25 \text{ J}$ $V = d/t = 20 / 4 = 5 \text{ m/s}$

Give Reasons:

1- The work done by a passenger car is less than the work done by a truck, even though they travel at the same speed. 1- bec mass of truck is more than car mass

2- The kinetic energy of the car decreases when the driver presses the brakes. 2- due to decrease speed of car

3- The work required to stop a car moving at high speed increases. bec as velocity of body increases the work done to stop it increases

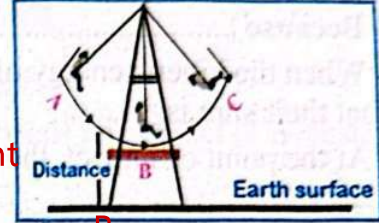
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When is?

- 1 - Kinetic energy = zero. 1- object is at rest
- 2 - Kinetic energy is numerically equal to twice the mass of the object. when body moves with speed = 2 m/s

Look at the figure in front of you:

- 1- The reference point (rest position) of the swingB.....
- 2- At what position is the potential energy is great? P.E increasing by increasing height
ExplainA.C
- 3- At what position the potential energy equal to zero?.....B
- 4- At what position the kinetic energy greatest?.....
ExplainB.....bec.it.has.highest.velocity
- 5- At what position the kinetic energy equal to zero?A.C
- 6- The sum of the potential and kinetic energies =.....mechanical energy



The relationship between potential energy and kinetic energy

Two interrelated forms of mechanical energy, where one is converted into the other depending on the change in the position or movement of the body, while maintaining the law of conservation of energy in closed systems (absence of friction or resistance).

Transition between potential energy and kinetic energy:

The state of body	The gravitational potential energy		Kinetic energy
When falling freely ↓	decreases gradually to zero At A		increases tomaximum at A
When the body is thrown upward ↑	increases..... to maximum value at B		decreases gradually tozero at B

Law of Conservation of Energy

Energy cannot be created or destroyed, but only transformed from one form to another. Potential and kinetic energy are two sides of the same coin in the universe, explaining the motion of objects from raindrops to planets.

Mechanical energy:

- The sum of the potential and kinetic energy of a body in a gravitational field $ME = PE + KE$
- The mechanical energy of a body at any moment = **constant** (explain)
- Because **decreasing in p.E equals increasing k.E and vice versa**
- When the kinetic energy of a body increases, its potential energy **decreases** so that their sum is = **M.E constant**
- At the point of impact, the energy of **M.E** is equal to the energy of **K.E**
- When any object is thrown upwards, its kinetic energy = zero at **Max height**
Because **speed = zero**
- At the midpoint of the vertical distance, the energy of **P.E** is equal to the energy of **K.E**

Energy transformations in a simple pendulum

Body energy	At the point (c,b) maximum height	simple pendulum	At the resting position
P.E	increases to maximum		decreases to zero A
K.E	decreases to zero		increases to A

Life Application

Medical Application	Life Application	
When lifting heavy objects from the ground, it is recommended the load be on leg rather than the back so as not to cause injury of spine	Generating electricity in a sustainable manner as a result of converting P.E water behind dams into K.E when it rushes, as in high dam Aswan.	Demolition of buildings as a result of converting P.E into energy K.E using demolition old buildings

Using the textbook and in light of your studied , define the following :

Mechanical energy

sum of potential and kinetic energies of any moving body

Homework week (8)

1- Compare between potential energy and kinetic energy.

2- State the scientific reason: The mechanical energy of any object is a constant quantity that does not change. bec increasing in P.E equal the decreasing in K.E

3- Correct the following statements:

- The potential energy of an object is greatest when it passes through its original position. Kinetic

- Mechanical energy is greatest when the object is at its highest point above its original position. Potential

4- Calculate the kinetic energy of a plastic ball with a mass of 4 kg moving at a speed of 2 m/s. $K.E = \frac{1}{2} M \times V^2 = \frac{1}{2} \times 4 \times (2)^2 = 8 J$

5- Calculate the mechanical energy of an object with kinetic energy of 4 J and potential energy of 5 J. $M.E = P.E + K.E = 5 + 4 = 9 J$

Weekly assessment

Week 8

Give reasons : 1-bec as height decreases P.E decreases

1- The gravitational potential energy decreases when an object falls.

2- The mechanical energy remains constant while the object falls in the absence of friction. 2- bec decreasing in P.E equals increasing K.E

3- The kinetic energy of the object = zero at maximum height. 3- bec velocity is zero

Compare each of the following:

1- The mechanical energy of an object at its maximum height and when it reaches the ground. remains constant

2- The potential energy at maximum displacement and at the reference point of the pendulum ball. max zero

3- The kinetic energy of the pendulum ball at its maximum height and at the reference point. zero maximim

Determine the importance or function of each of the following:

1- Converting potential energy into kinetic energy in dams? generate electricity

2- The rubber band in a slingshot? convert P.E to K.E

3- Distributing the weight of objects evenly across the leg muscles when lifting them off the ground. protect spine

1- M.E = P.E at max height
P.E = $M \times g \times h = 2 \times 10 \times 2 = 40 \text{ J}$

2- M.E = P.E at max height
 $M \times g \times h = 0.5 \times 10 \times 15 = 75 \text{ J}$
so K.E at ground = 75 J

Science

Unit Three: Environment and Genetics

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Miscellaneous problems:

- 1- An object slides from a height of 2 m. If its mass is 2 kg, calculate the total mechanical energy at the starting point.
- 2- A ball with a mass of 0.5 kg falls from a height of 15 m. Calculate its kinetic energy at the moment it reaches the ground if the mechanical energy is constant.
- 3- An object with a mass of 2 kg falls from a height of 8 m. Calculate both the potential energy and kinetic energy at the following positions:
A. At the point of fall. B. At the midpoint of the distance.

3-
A K.E zero
P.E $m \times g \times h$
 $2 \times 10 \times 8 = 160 \text{ J}$
= M.E

b-P.E = K.E
 $1/2 \times 160 = 80 \text{ J}$

Unit Three: Environment and Genetics

Lesson one

Nutritional Relationships in Biological Communities

Week 9

Class performance

Date: / /

The Ecosystem

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Look at the following figure then complete

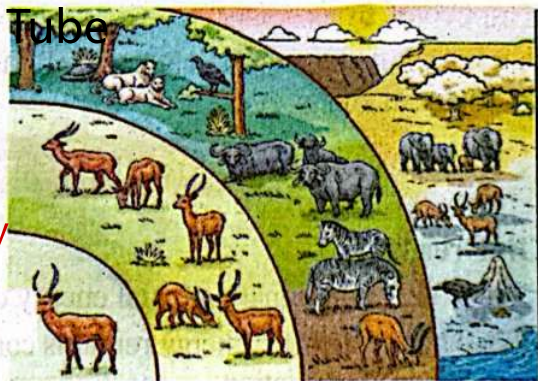
- The ecosystem includes several levels of organization are individual, biotic population, and biological community

- The fundamental unit in the classification of the living organisms is species

- The various biotic population of different species that inhabit the same environment are called biological community

- A group of individuals of the same species living in a particular place at the same time is biotic population

- A single living organism that belongs to a specific species of living organisms is individual



Patterns of Nutritional Interaction Among Individuals of Biological Communities

Predation

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- Complete the following:

- The Predation is a nutritional relationship between two individuals, one of them called predator and the other called prey

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Unit Three: Environment and Genetics

Performances and Assessments

- The Predator is the individual that ^{benefit} From the predation relationship.
- The Prey is the individual that is ^{harmed} or ^{lose} its life in the predation relationship.

Notice the following pictures then determine the predator and prey



^{insect}.....is a prey
^{Dionaea plant}.....is a predator



^{zebra}.....is a prey
^{lion}.....is a predator



^{insect}.....is a prey
^{chameleon}.....is a predator

Competition

- Complete the following:

- The Competition is a nutritional relationship between two individuals of the same ^{species} for a food resource that exists in ^{limited} quantities, which ^{negatively} impacts their growth or survival.

- Notice the following picture then complete:

- The picture represents the ^{competition} relationship between two ^{lions} on ^{food source}.
- In this relationship both individuals are ^{harmed}.



Mutualism

- Complete the following:

- The Mutualism is a nutritional relationship between two individuals, both of them ^{benefit} from each other without causing ^{harm} to either of them.

Notice the following picture then complete:

- The picture represents the ^{mutualism} relationship between ^{root nodular bacteria} and ^{Bean plant}.
- obtain nitrogenous materials from which fix nitrogen from the air to build ^{protein- enzymes} and while obtain their food from plant as a result of the process of ^{photosynthesis}.



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Second term

First Preparatory

39

Commensalism

- Complete the following:

The commensalism is a nutritional relationship between two individuals, one of them..... and the other neither nor

- The is the individual that benefits from commensalism relationship.

- The is the individual that neither benefits nor is harmed in the commensalism relationship.

Notice the following picture then complete:

- The image represents the relationship between and.....

- The benefits by feeding on leftover food that get trapped between the crocodile's teeth, While the neither benefits nor is harmed.



Living organisms within any biological community are classified into producers, consumers and decomposers.

Compare between them in terms of definition and examples

Points of comparison	Producers	Consumers	Decomposers
Definition	living organisms can make food through photosynthesis	living organisms can't make food and depend on other living organisms	living organisms get their food by decomposing dead bodies
Examples	green plants green algae	animals Human	bacteria fungi

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Consumers are classified into

Herbivores, Carnivores, Omnivores and Scavengers.

Compare between them in terms of nutrition and examples

Points of comparison	Herbivores	Carnivores	Omnivores	Scavengers
Definition	plant eaters	meat eaters	feed on plants and animals	feed on remains of dead organisms
Examples	horse cow	lion tiger	bear mouse	Hyenas Eagle

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Energy Flow Among Living Organisms

First: Food chain

- Food chain is the path of energy transfer (flow) in the form of ^{food} As it moves from ^{one living - another} to within the ecosystem.

- Any food chain consists of:

- 1- ^{producers} occupying the ^{first} trophic level.
- 2- ^{consumers} occupying the ^{higher} trophic levels above the first level.
- 3- ^{Decomposers} obtains the energy from any dead organism in the trophic level.

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Notice the following figure then complete

^{plants} obtains its energy directly from the sun, and represents the ^{producers}

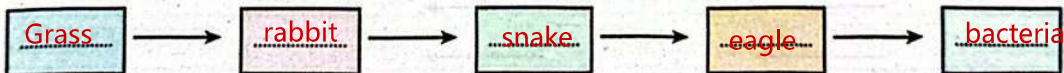
^{Rabbit} obtains its energy by feeding on plant and represents ^{primary consumer} consumers and from ^{herbivores} animals.

- ^{snake} obtains its energy by feeding on ^{rabbit} and represents ^{secondary} consumers.

- ^{Eagle} obtains its energy by feeding on ^{snake} and represents ^{tertiary} consumers.

- ^{Bacteria} obtains its food from ^{producers} organisms or ^{consumers} organisms after their death.

- The energy flow in this food chain is expressed as follows:



Notice the following figure then complete:

- The image represents ^{marine} food chain.

- The ^{algae} represents a producer.

- The ^{copepod} represents a primary consumer.

- The ^{fish} represents a secondary consumer.

- The ^{seal} represents a tertiary consumer.



- The energy flow in this food chain is expressed as follows:



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Sustainable agriculture

Biological Control: A method in which utilisation of living organisms through food systems to eliminate agricultural pests instead of using pesticides

Example: The dotted beetles..... feeds on .aphid... insect which is harmed
vegetables..... and ..fruits.. ladybug

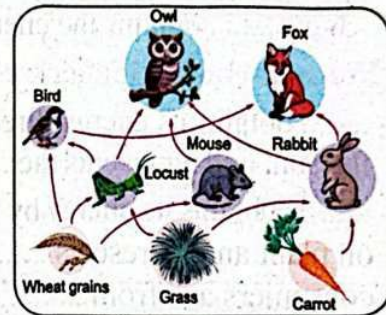
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Food web

- Food web is the and of multiple food chains together.

interconnection - overlapping

- Notice the following figure, then complete:
- Wheat grains , grass and carrot represents ...producers
 - Bird , locust , mouse and rabbit. represents...primary consumers
 - Owl and fox represents.....secondary consumers and is occupied the top of the food chains.



- There are five energy paths that end with the fox, such as

- Wheat grains → locust → Bird → fox
- grass → locust → Bird → fox -

Mention another three examples

- carrot → rabbit → fox
- grass → rabbit → fox
- wheat → bird → fox

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Important note

The bird is considered a predator and pry
a predator, as it feeds on locust,
and a pry, as the fox feeds on it

Ecological Balance

- The absence of any living organism from a balanced ecosystem affects the remaining individuals of the food chain or the food web, leading to adisruption of this ecological balance or even its.....destruction
- The increase in the numbers of the primary consumers leads todecrease in the numbers of the producers andincrease in the numbers of the secondary consumers.
- The decrease in the numbers of the secondary consumers leads todecrease in the numbers of the primary consumers andincrease in the numbers of the tertiary consumers.

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Energy pyramid

A pyramid represents the flow of energy and its amounts between the different trophic levels in any food chain.

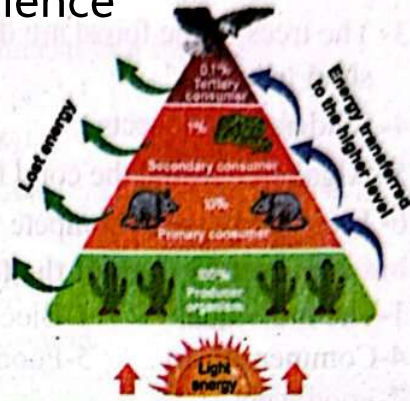
- Notice the following figure, then complete:

- The base of the pyramid is occupied by the producers, while its apex is occupied by the last..... in the food chain.

- Only 10% of energy is transferred from the living organisms at any trophic level to the living organisms which occupy the next trophic level in the energy pyramid.

- 90% of energy is lost when moving from any trophic level to the next level.

- By using the student book and According to which you have studied, determine what is meant by the following statements



The ecosystem	Any place	includes living organisms and non living things
Nutritional Relationships		feeding relationships between living organisms
Commensalism	nutritional relationship between two individuals one of them benefit (commensal) and other neither benefit nor is harmed (host)	
Mutualism	nutritional relationship between two individuals both of them benefit	
Predation	nutritional relationship between two individuals one of them benefit (predator) and other is harmed (prey)	
Food chain	path of energy	in form of food flow from one living organism to another
Food Web	interconnection	and overlapping of multiple food chains

carrot - rabbit - snake
carrot - rabbit - fox

Homework week (9)

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Create food chains and food webs from the following organisms:

Carrot - Shrimp - Grass - Seal - Wheat - Deer - Mouse - Rabbit - Bacteria and Fungi - Sparrow - Fox - Falcon - Snake - Fish - Bear - Algae - Lion

Create an energy pyramid from the following organisms:

Carrot - Shrimp - Grass - Seal - Wheat - Deer - Mouse - Rabbit - Sparrow - Fox - Falcon - Snake - Fish - Bear - Algae - Lion

Mention the type of food relationship in each of the following:

- 1- The remora fish that sticks to the shark's body and gets its food remains without affecting it on the shark. commensalism
- 2- The falcon that hunts mice. predation

nake
mouse
grass

3- The trees in the forest are densely packed together, blocking light from the short trees. **competition**

4- Spiders hunt insects **predation**

5- Algae live inside the coral tissues. **mutualism**

6- Lions and hyenas compete for gazelles or zebra. **competition**

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What is meant by each of the following:

1-The individual

2-Biocommunity

3-Competition

4-Commensalism

5-Food chain

6-Decomposers

7-Food webs

Problem: Calculate the amount of transferred energy which reaches to third level if the energy at the first level is equal to 1000J.

-The energy which reaches the second level = $\frac{1000}{10} = 100 \text{ J}$

-The energy which reaches the third level = $\frac{100}{10} = 10 \text{ J}$

Weekly assessment

Week 9

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Complete the following:

1-The ecosystem consists of **living organisms** and **non living things**

2-Non-living components such as **air** and **water**

3- The ecosystem consists of several levels: the individual, **biotic population** and **biological community**

4- **species** is considered the basic unit in the classification of living organisms.

5- **commensal** is the individual that benefits from commensalism.

6- **host** is the one that is neither benefited nor harmed in commensalism relationship.

7-Each stage in which energy is transferred in the food chain is called **trophic level**

8- The rabbit and the horse are considered **herbivores** because they have **incisors** for cutting plants.

9- Carnivorous animals such as **lion** and **tiger** are characterized by having sharp canines to **tear-cut** their preys.

10- Omnivorous animals such as **bear** and **mouse** feed on both meat and plants.

11- Hyenas and **eagles** are considered **scavengers**, as they feed on the remains of dead organisms.

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What happens when:

1- Lack of food sources in a balanced ecosystem

2- Food shortage for a group of hyenas

leads to competition between individuals of same species causing harm for them

3- The absence of one of the living organisms present in a balanced ecosystem. *cause disturbance in the ecosystem*

4- Increase in the number of primary consumers

producers decrease while secondary consumers increase

5- Decrease in the number of secondary consumers

primary consumers increases - tertiary decrease

What is meant by each of the following:

1-Ecosystem

2-Predation

3-Mutualism

4-Food chain

5-Biological control

6-Energy pyramid

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Lesson Two

Genetic traits and Mutations

Weeks 10, 11

Class performance Date: / / , Date: / /

Genetic Traits And Acquired Traits

1 Traits that are not inherited from parents to offspring but are acquired from the surrounding environment through learning or training, and do not transmitted from one generation to another.

Acquired

2 Traits that are transmitted from parents to offspring without learning , and are inherited from one generation to the next.

Genetic

3 Behaviours and skills that are transmitted from parents to offspring without learning .

instinctive

Acquired 4 A child learning to walk

5 A dolphin playing with a ball

Acquired

Genetic 6 The human hair color

7 A bat sleeping upside down

instinctive

Genetic 8 The eye colour

9 The short legs of the Arctic fox

Genetic

10 Building strong muscles of a sports champion

Acquired

instinctive 11 Chicken laying on eggs

12 A squirrel breaking hazelnut shell

instinctive

Genetic 13 The length of giraffe's neck

14 The horse jumping over obstacles

Acquired

instinctive 15 The bird building its nest

Genetic 16 The presence of a hard shell on a turtle's foot

Second term

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on YouTube - Read the previous statement and sentences, then label the number in suitable place

Genetic traits	2	6	8	9 / 13	16
Acquired traits	1	4	5	10	14
Instinctive behaviours	3	7	11	12	15

- Complete the following:

- The reproduction is a vital process aims to produce **new**.... individuals that resemble their parents.
- Genetics traits are transmitted from parents to offspring through... **genes**... **chromosomes**
- The chromosomes **thread** like bodies that represent the genetic materials of organism.
- The genetic materials is found in **nucleus** of the eukaryotes, while found in **cytoplasm** of the prokaryotes.
- An individual inherits **half**... of its chromosomes from **father**... and the other half from.... **mother**



Homework week (10)



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Compare between:

- 1- Hereditary traits and acquired traits in terms of Definition - Examples
- 2- Acquired traits and instinctive behaviours in terms of Definition - Examples

Give reasons for the following: 1- due to difference in nucleotides arrangement

- 1- The genes found on a single chromosome are different.
- 2- DNA is known as a double helix. 2- bec it consists of double strands twist around each other
- 3- Smooth hair is considered a hereditary trait, while learning to swim is an acquired trait. 3- bec smooth hair trait is transmitted from parents to offspring while swimming isn't transmitted from parents but acquired by learning or training
- 4- A squirrel breaking a nut is considered an instinctive behaviour.
- 5- Mendel is considered the founder of genetics. 5- bec his researches in hereditary which conclude that each hereditary trait controlled by two genetic factors

4- bec it is behaviour or skill transmitted from parents to offspring without learning

Give one example of each of the following:

- 1- A hereditary trait in humans eye color

2- An acquired trait in horses **jump over obstacles**

3- A plant that can be obtained from chromosomes **strawberry**

4-Instinctive behaviour in chickens **lay on eggs**

Weekly assessment

Week 10

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Complete the following:

- 1- The genetic material is found in..... of prokaryotic organisms and in..... of eukaryotic organisms
cytoplasm **nucleus**
- 2- Examples of hereditary traits in humans are and
eye color **hair color**
- 3- Examples of acquired traits in humans are and
swimming **speaking languages**
- 4- A hen sitting on eggs is an example of a(n) behaviour, while a dolphin playing with a ball is a(n) trait
instinctive **acquired**
- 5- Chromosomes are found in a shape inside the nucleus
thread
- 6- Genetic traits are passed from parents to offspring through.....
chromosomes

What is meant by each of the following:

- 1- Genetics
- 2- Inherited traits
- 3- Instinctive behaviors
- 4- Acquired traits
- 5- Chromosomes

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Read the following statements carefully and correct the incorrect ones:

- 1- Inherited traits are traits passed from offspring to parents **parents to offspring**
- 2- Brown eye color is an acquired trait **inherited**
- 3- The presence of a solid body structure covering the frog is an inherited trait **turtle**
- 4- Instinctive behaviours are passed from parents to offspring without learning
- 5- Acquired traits are not inherited and are acquired by humans from the environment
- 6- Breastfeeding is an acquired trait **instinctive**
- 7- Genetic material is found in the cytoplasm of eukaryotes **nucleus**
- 8- Chromosomes are thread-like bodies found inside the nucleus in the bean Plant

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Second term

First Preparatory

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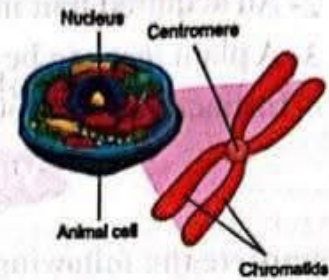
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Structure of chromosomes

Notice the opposite figure then complete:

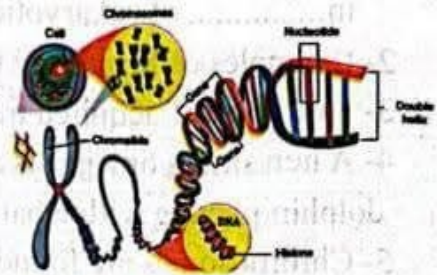
- Each chromosome consist of two threads, each called **chromatid** and connected at a central point known as **centromere**



The chemical structure of DNA

Notice the opposite figure then complete:

- The chromosomes composed of **nucleic acid** abbreviated as **DNA**, wrapped around a type of protein known as **histone**
- The nucleic acid DNA is made up of small segments called **genes**, they are responsible for appearance of **hereditary traits**
- Each gene consists of a sequence of smaller building units known as **nucleotides** which exist in the form of two strands twisted around each other, forming what is known as **double helix**



The role of the genes in expression of heredity traits

- **Complete the following:**
- The science that studies the transmission of genetic traits from parents to offspring is **genetics**
- **Mendel** is considered the founder of the science of genetics.
- The scientists **Tatum** and **Beadle** affirmed the **one gene one enzyme** hypothesis through their experiments.
- One gene- one enzyme hypothesis states that each **gene** produce a **chemical reaction**, which is responsible for the occurrence of a **hereditary** trait that leads to the formation of a **protein** that expresses a specific **hereditary** trait.

Mutations

- Is the emergence of a new hereditary trait that did not previously exist, as a result of a change in the nature of gene responsible for it.

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Type of Mutations

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Type of Mutations according to the origin

Spontaneous mutations	Induced mutations
Mutation that occur ^{naturally} without human intervention.	Mutation that occur through human ^{intervention}
Examples: ... ^{Albino child from dark skin mother}	Examples: ... ^{featherless chicken}

Type of Mutations according to their impacts

Harmful mutations	Beneficial mutations
Mutations that cause the appearance of traits ^{undesirable}	Mutations that cause the appearance of ^{desirable} traits, whether occurring ^{naturally} or through human ^{intervention}
Examples: ... ^{spinal deformity}	Examples: ... ^{seedless fruit}

Notice the opposite figure then clarify:

Is the production of cubic – shaped watermelon considered a mutation? And why?

^{no it is an agriculture technique by placing}^{watermelon in square mold during its growth}

- By using the student book and according to which you have studied, determine what ment by the following statements

Reproduction	vital process aims to produce new individuals resemble parents
Genetics	Science studies transmission of genetic traits... from parents to offspring
Hereditary Traits	traits transmit from parents to offspring without learning
Acquired Traits	traits not transmit from parents to offspring but acquired from ^{environment through learning or training}
Instinctive behaviours	behaviours or skills transmit from parents to offspring without learning
Genes	... ^{segments of DNA in the chromosome responsible for appearance of hereditary} traits
Mutation	

emergence of new hereditary traits not previously exist as change in the nature of gene

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Homework week (11)

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Compare between:

Spontaneous mutation and induced mutation in terms of:

Definition - Examples

1- bec each gene produce enzyme responsible for chemical reaction that produces protein responsible for appearance of hereditary trait

Give reasons for the following:

1- Genes are considered responsible for the appearance of hereditary traits

2- A dark-skinned mother giving birth to an albino child is considered a spontaneous mutation 2- bec it occurs naturally without human intervention

3- Light skin color in people living in cold regions is a beneficial spontaneous mutation 3- bec it helps them to absorb vitamin D better

4- Producing cube-shaped watermelons is considered an agricultural technique and not a mutation 4- bec it occurs by placing watermelon in square mold during its growth

5- Lactose tolerance is considered a beneficial mutation 5- bec it convert lactose sugar in milk and dairy products into simple sugar to make body absorb them easily

1- mutation due to difference in nature of gene.

What are the consequences of

1-A difference in the order of nucleotides in a single chromosome

2-The formation of genes for certain enzymes

3- take cube shape (cubic watermelon) to facilitate its transportation

3-Placing watermelons in square-shaped metal molds when they grow

2-occurrence of chemical reaction that produce protein responsible for appearance of specific hereditary trait

Give one example of each of the following:

1- A spontaneous mutation in humans Albino child from dark skin mother

2- An induced mutation in chickens featherless chicken

3- A beneficial mutation in humans light skin color in individual live in cold countries

4- A harmful mutation in humans curved spine

5-An alternative to butter for a person suffering from lactose intolerance olive oil

6- An alternative to milk for a person suffering from lactose intolerance soy milk

7- An alternative to chocolate for a person suffering from lactose intolerance dark chocolate

Weekly assessment

Week 11

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Complete the following:

1-Each gene consists of smaller units called.....nucleotides

2- Nucleotides exist in the form of.....2 strands twisted around each other, and called double helix

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- 3- Each chromosome carries thousands or millions of..... **genes** which vary in number from one chromosome to another in the cells of the same individual.
- 4- The chromosome consists of **chromatids** which are connected at **centromere**
- 5- The chromosome is chemically composed of **DNA** and protein known as **histone**
- 6- The nucleic acid is made up of small segments called **nucleotides**
- 7- The mixture used in separating strawberry chromosomes consists of **washing dishes soap** and **salt** with **water**
- 8- **Mendel** is considered the founder of genetics, and he conducted his experiments on the **Pea** plant.
- 9- The scientists **Beadle** and **Tatum** affirmed hypothesis for expressing genetic traits and called it **one gene - one enzyme**
- 10- Genes produce **enzyme**, which is responsible for a chemical reaction that leads to the formation of **protein**, showing the genetic trait.
- 11- Spinal curvature is a result of **spontaneous** mutations.
- 12- The production of seedless lemons is a result of **induced** mutations.

What is meant by each of the following:

- 1- Mutation
- 2- Spontaneous mutation
- 3- Induced mutation
- 4- The centromere

Read the following statements carefully and correct the incorrect ones:

- 1- The chromosome is chemically composed of DNA and protein
- 2- The nucleic acid is made up of small parts known as nucleotides
- 3- Spontaneous mutation occurs without human intervention
- 4- Production of featherless chickens is considered induced mutation
- 5- Light skin color people living in cold regions due to beneficial mutations
- 6- Production of cube-shaped watermelons from induced mutations **featherless chicken**
- 7- People who suffer from lactose intolerance experience cramps and nausea when they eat meat **milk - dairy product**
- 8- Beneficial mutations cause the appearance of desirable traits
- 9- The chromosome consists of two threads, each of them called a chromatid.
- 10- The number of chromosomes in human is 46 chromosomes and in corn plant is 32 chromosomes **20**

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Monthly Exercise (2)

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Question (1): Complete the following with suitable word

- 1- The kinetic energy of an object depends on **mass - speed**
- 2- The unit of kinetic energy is the joule, which is equivalent the... **$\text{Kg} \cdot (\text{m/s})^2$**
- 3- If the speed of an object decreases to half with constant mass, its kinetic energy..... **decrease to quarter**
- 4- When an object falls vertically downwards, **decrease** potential energy and **increase**.. kinetic energy .
- 5- The mass of an object is measured in units of **...Kg....**, while its speed is measured in units of **....m/Sec**
- 6- The main source of energy on Earth's surface is **sun**
- 7- The food chain begins with a **producer** organism and ends with a **decomposer** organism.
- 8- Fungi are considered **decomposer** organisms, while **primary consumers** are herbivores.
- 9- Any ecosystem consists of **biological communities**, each of which consists of biological **biotic** communities, which in turn consist of **individuals** **population**
- 10- Both living organisms are not harmed in a **mutualism** relationship.
- 11- The point where the two chromatids of the chromosomes are connected is called **centromere**
- 12- The two scientists who, affirmed the one gene-one enzyme hypothesis through their experiments, are **Beadle - Tatum**
- 13- Genetic material is found in **cytoplasm** prokaryotic organisms.
- 14- The production of seedless fruits is considered a **beneficial induced** mutation. .
- 15- A gene produces **enzyme** is responsible for a specific chemical reaction.
- 16- The number of chromosomes in human skin cells is **46** chromosome
- 17- The production of cubic-shaped watermelons is a **not**.... mutation.
- 18- The albino mutation is **spontaneous** mutation. .
- 19- Behaviors and skills that are passed from parents to offspring without learning are..... **bird build nest - chicken lays on eggs** and

Q2: What is meant by each of the following:

- | | |
|-------------------------|-----------------------|
| 1- Kinetic energy. | 2- Mechanical energy. |
| 3- Ecosystem | 4- Species |
| 5- Biological Community | 6- Biotic population |

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25- Ecological Balance

26- Energy Pyramid

27- Genetic Traits

28- Acquired Traits

29- Spontaneous Mutations

30- Induced Mutation

31- Mutation

32- Instinctive Behaviours

33- Genetics

Q3: Give reasons for each of the following:

- 1- The work required to move a car increases as its mass increases.
2- bec it converts water potential energy into K.E which move turbines to generate electricity
- 2- The High Dam has great importance in generating electricity in Egypt.
3- bec it occurs by human intervention and produce desirable trait to reduce electricity consumption
- 3- The production of featherless chickens is a beneficial induced mutation.
4- bec his researches in hereditary which conclude that each hereditary trait controlled by two genetic factors
- 4- Mendel is considered the founder of genetics science.
5- bec eye color is transmit from parents to offspring through genes (chromosomes) while walking is acquired through learning or training
- 5- Eye color is considered a Genetic trait, while learning to walk is an acquired trait. 6- bec it occurs naturally without human intervention
- 6- The birth of an albino child by a dark-skinned mother is considered a spontaneous mutation. 7- bec each gene produce enzyme to make chemical reaction that produces protein control appearance of specific trait
- 7- Genes control the appearance of an individual's genetic traits.

Q4: What happens if:

- 1- The speed of a moving object is doubled, while its mass remains constant (in terms of kinetic energy). **increases 4 times**
- 2- An object falling from a height (in terms of potential and kinetic energy). **2- P.E decreases K.E increases**
- 3- A pendulum passing through a position of rest (in terms of potential and kinetic energy). **P.E = zero - K.E will be maximum**
- 4- The absence of one living organism present in a balanced ecosystem. **4- causes environmental imbalance - affect food chain**
- 5- An increasing in the number of primary consumers in the food chain. **5- producers decrease while secondary consumers increase**
- 6- Lack of food sources among members of biotic population.
- 7- Variation in the arrangement of nucleotides on DNA.

Second term

6- competition occurs which harm them
7- mutation will occur

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Science

Unit Three: Environment and Genetics

مس عير

Q5: What's meant by each of the following:

- The energy which the body gains as a result of its motion. **Kinetic energy**
- The work done to moving an object. **Kinetic energy**
- The sum of the potential and kinetic energies of any moving object. **Mechanical energy**
- A heavy tool used to demolish old buildings results from the changing of potential energy into kinetic energy. **demolition ball**
- Individuals of different biotic population which live in the same environment. **biological community**
- A feeding relationship between two individuals in which one benefits, while the other is harmed. **predation**
- A feeding relationship between two individuals, both of them benefit from each other, without causing harm to either of them. **mutualism**
- A feeding relationship between two individuals one of them known as the commensal and the other known as the host. **commensalism**
- Consumers that feed on plants and animals. **omnivorous**
- Consumers that feed on the remains of dead organisms. **scavengers**
- The interconnection and overlapping of multiple food chains together. **food web**

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Q6: Mention one example of each of the following:

- | | | |
|--|--------------------------------------|---|
| albino child from dark skin mother | - A genetic trait. eye color | - An induced mutation. featherless chicken |
| | - An acquired trait. swimming | - A harmful mutation. curved spine |
| | - A spontaneous mutation. | - A carnivore. lion |
| lion individuals compete for limited food source | - A competition relationship. | - A commensalism relationship. crocodile - plover bird |
| | - A decomposer. bacteria | - An omnivore. bear |
| | - Herbivore. horse | - A scavenger. eagle |
| | - A producers. green plant | - Mutualism. bees - plant |
- 1- producers :green plants can make food by photosynthesis process - consumers (horse) can't make food but depend on other living organisms
- 2-scavenger: dead bodies(eagle) omnivorous: feed on plants - animals (bear)
- 3- spontaneous: naturally : albino child induced:with human intervention featherless chicken
- 4- genetic: traits transmitted from parents to offspring (eye color) acquired: not transmit from parents to offspring but acquired through learning or training (swimming)
- 5- predation : feeding relationship between two different types of living organisms one benefit (predator (and one is harm (prey) Mutualism : feeding relationship between two living organisms both of them get benefit without harm

Q7: Compare between each of the following:

- Producers and consumers "in terms of definition, example"
- Scavengers and omnivorous "in terms of type of food, example"
- Spontaneous and induced mutations "In terms of: how each of them occurs, example"
- Genetic traits and acquired traits "in terms of definition, example"
- Predation and mutualism

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Q8: Complete the following table.

$$\frac{1}{2} M \times V^2$$

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Mass m.(kg)	Speed V. (m/s)	Kinetic energy K.E. (Joule)
2	8	64
6	4	48
6	5.6	96

$$\frac{2 \text{ K.E.} / V^2}{\sqrt{2 \text{ K.E.} / m}}$$

Q9 : The following figures illustrate some consumer organisms. Identify:

- Which of these organisms is an omnivores, scavengers, herbivores, or carnivores? lion
- Compare between the lion and the horse in terms of: type of food, shape of teeth.

lion
meat eater
pointed
canineshorse
grass eater
presence of
incisors

Q10: The following figures illustrate a living organism.

Answer the following questions:

- What is the name of this organism? lady bug - beetle
- What organisms does it feed on? aphid insect
- Mention its benefits for the environment? get rid of aphid insect that harm crops



Q11: Classify the following according its type(genetic traits, acquired traits, or instinctive behaviors):

- 1-Reading and writing. acquired
- 2- The length of a giraffe's neck. genetic
- 3- A squirrel breaking a hazelnut shell. instinctive
- 4- Learning to swim. acquired
- 5- A spider weaving its web. instinctive
- 6- The short legs of an arctic fox. genetic
- 7- Learning the Indian language. acquired
- 8- Birds laying on eggs. instinctive
- 9- A horse jumping over obstacles. acquired
- 10- Facial freckles. genetic
- 11- Breast feeding. instinctive
- 12- Blood type. genetic
- 13- A dolphin playing ball. acquired
- 14- A bat sleeping upside down. instinctive
- 15- Hair color. genetic

صفحة القيس تعالوا

نتعلم صح مع مس عبير

حمل الآن

مجاناً وحصرياً

المراجعة رقم (3)

اختبار شهر ابريل

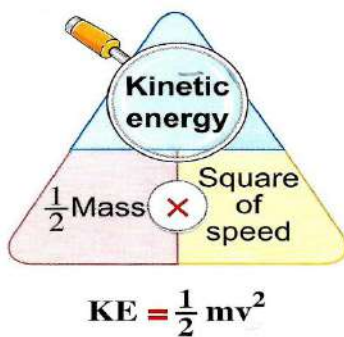


Unit (2)-Lesson 2: Kinetic Energy

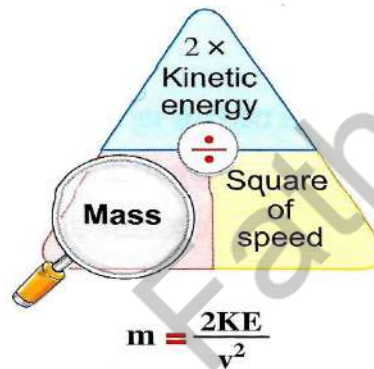
Kinetic Energy

Definition	The energy acquired by an object as a result of its motion
Rule	Kinetic energy (KE) $\ominus$ $\frac{1}{2}$ mass (m) $\otimes$ Square of the speed (v) ²
Measuring unit	Joule

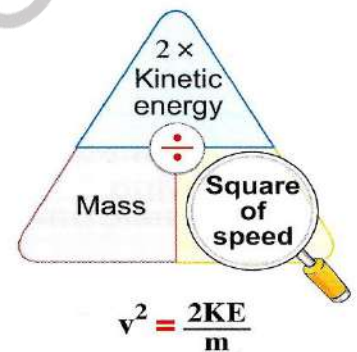
Calculating kinetic energy



Calculating mass



Calculating square of speed



-What is meant by that kinetic energy of an object equals 50 J?

This means that the energy acquired by the object as a result of its motion equals 50 J.

-What is meant by that the kinetic energy of an object equals zero?

This means that the object is at rest (its speed is zero).

Factors affecting kinetic energy

1-Mass of the Object

-Increasing the mass of a moving object leads to an increase in its kinetic energy.

Independent variable: Mass of the ball.

Controlled variables:

- Height of the ramp (speed of the ball).
- The bucket.

Dependent variable: The distance that the bucket moves (as a result of the kinetic energy of the ball).

1-Speed of the Object

-Increasing the speed of the moving object leads to an increase in its kinetic energy and vice versa.

Independent variable: Height of the ramp (speed of the ball).

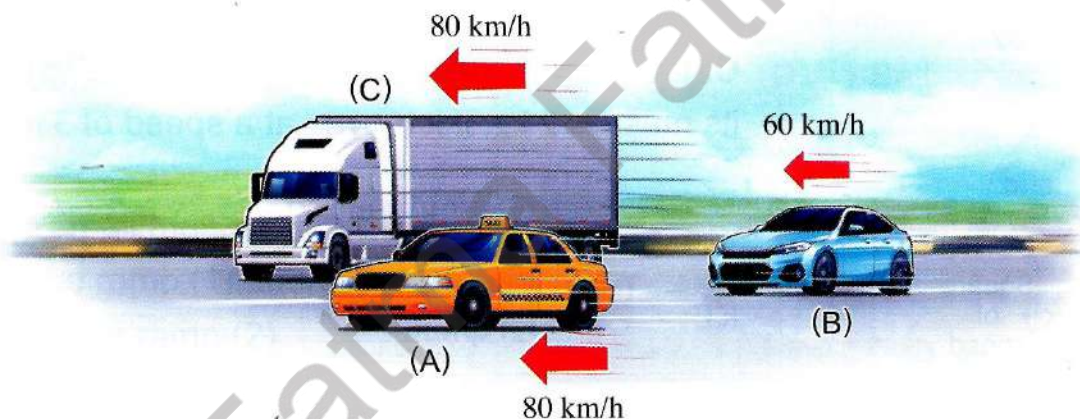
Controlled variables: • Mass of the ball. • The bucket.

Dependent variable: The distance that the bucket moves (as a result of the kinetic energy of the ball).

What happens when ? With explanation.

- Two cars (A) and (B) have the same mass but different speeds.

- Car (A) and truck (C) move at the same speed.



- Car (A) does more work than car (B), even though their masses are equal.

- Truck (C) does more work than car (A), even though their speeds are equal.

Explanation

- Because as the speed of the object increases, its kinetic energy increases, and thus the work done increases.

- Because as the mass of the object increases, its kinetic energy increases, and thus the work done increases.



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Representation of the graphical relation

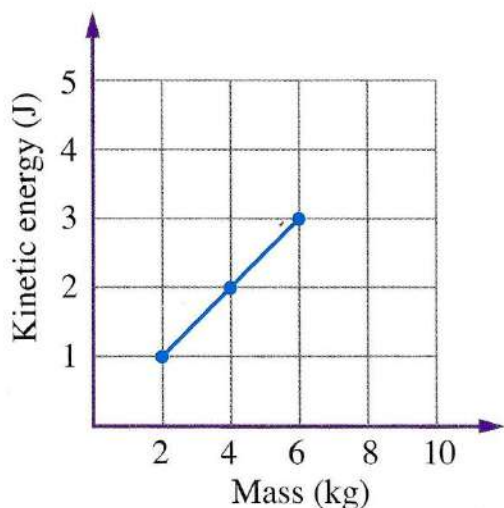
Between

Kinetic energy (KE)

And

Mass (m)

At constant **speed**



The graphical relation between **kinetic energy** and **mass** for several different objects

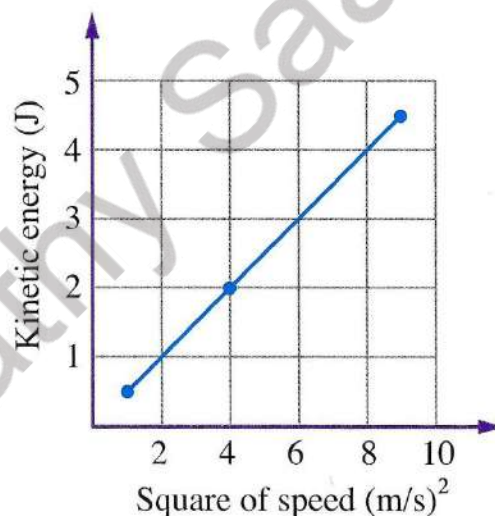
Between

Kinetic energy (KE)

And

Square of the speed $(v)^2$

At constant **mass**



The graphical relation between **kinetic energy** and the **square of speed**



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What happens to Kinetic energy in the following cases ?

- ① If the mass of a moving object **decreases to half** "with constant speed".

$$m_2 = \frac{1}{2} m_1$$

$$v_2 = v_1$$

The kinetic energy of the object **decreases to half**

- ② If the speed of a moving object is **doubled** "with constant mass".

$$v_2 = 2 v_1$$

$$m_2 = m_1$$

The kinetic energy **increases to four times its value**

- ③ If the mass of a moving object **decreases to half** and its speed is **doubled**.

$$v_2 = 2 v_1$$

$$m_2 = \frac{1}{2} m_1$$

The kinetic energy **increases to double**

- ④ If the mass of a moving object **decreases to quarter** and its speed is **doubled**.

$$v_2 = 2 v_1$$

$$m_2 = \frac{1}{4} m_1$$

The kinetic energy **remains constant (unchanged)**

Numerical Application :

$$KE = \frac{1}{2} mv^2$$

In the first case

$$m_1 = 5 \text{ kg}$$

$$v_1 = 10 \text{ m/s}$$

$$(KE)_1 = \frac{1}{2} \times 5 \times 10 \times 10$$

$$= 250 \text{ J}$$

In the second case

$$m_2 = 2.5 \text{ kg}$$

$$v_2 = 10 \text{ m/s}$$

$$(KE)_2 = \frac{1}{2} \times 2.5 \times 10 \times 10$$

$$= 125 \text{ J}$$

Decreases to half

$$m_1 = 5 \text{ kg}$$

$$v_1 = 10 \text{ m/s}$$

$$(KE)_1 = \frac{1}{2} \times 5 \times 10 \times 10$$

$$= 250 \text{ J}$$

$$m_2 = 5 \text{ kg}$$

$$v_2 = 20 \text{ m/s}$$

$$(KE)_2 = \frac{1}{2} \times 5 \times 20 \times 20$$

$$= 1000 \text{ J}$$

Doubled

Increases to 4 times

$$m_1 = 5 \text{ kg}$$

$$v_1 = 10 \text{ m/s}$$

$$(KE)_1 = \frac{1}{2} \times 5 \times 10 \times 10$$

$$= 250 \text{ J}$$

$$m_2 = 2.5 \text{ kg}$$

$$v_2 = 20 \text{ m/s}$$

$$(KE)_2 = \frac{1}{2} \times 2.5 \times 20 \times 20$$

$$= 500 \text{ J}$$

Decreases to half

Doubled

Doubled

$$m_1 = 5 \text{ kg}$$

$$v_1 = 10 \text{ m/s}$$

$$(KE)_1 = \frac{1}{2} \times 5 \times 10 \times 10$$

$$= 250 \text{ J}$$

$$m_2 = 1.25 \text{ kg}$$

$$v_2 = 20 \text{ m/s}$$

$$(KE)_2 = \frac{1}{2} \times 1.25 \times 20 \times 20$$

$$= 250 \text{ J}$$

Decreases to quarter

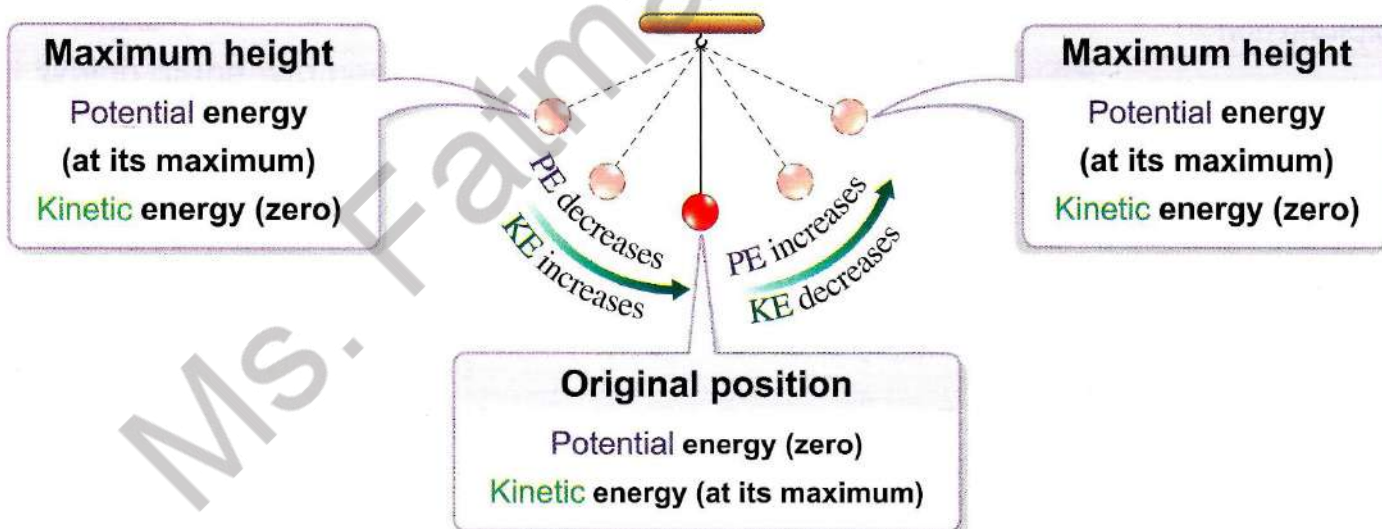
Doubled

Remains constant

Potential energy (PE) and kinetic energy (KE).

	Potential energy (PE)	Kinetic energy (KE)
Definition	The energy stored in an object as a result of the work done on it	The energy acquired by an object as a result of its motion
Affecting factors	• Weight of the object. • Height of the object above the ground surface.	• Mass of the object. • Speed of the object.
Mathematical relation used in calculation	$PE = w h$	$KE = \frac{1}{2} m v^2$
Measuring unit	Joule (J)	Joule (J)

The relation between potential energy and kinetic energy



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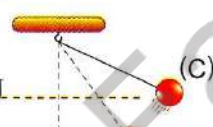
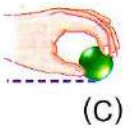
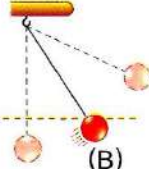
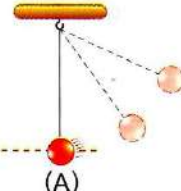
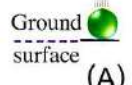
-Mechanical energy: The summation of the potential and kinetic energies of any moving object.

-What is meant by the mechanical energy of a moving object equals 100 J?

This means that the sum of the potential and the kinetic energies of this object throughout its motion equals 100 J.

$$\text{Mechanical energy (ME)} = \text{Potential energy (PE)} + \text{Kinetic energy (KE)}$$

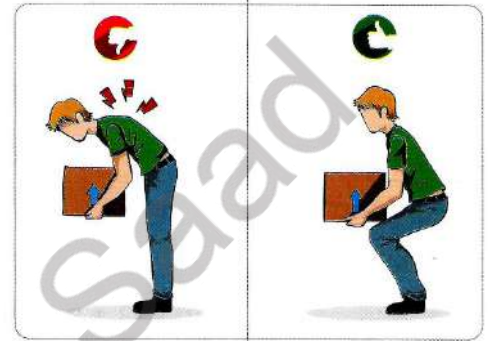
Guidelines for Solving Problems

Case	Pendulum motion	Free ball fall from a higher position
At maximum height (C) "Position of fall" KE = zero ME = PE	Numerical Application : $(ME) = (KE) + (PE)$ 0.2 J zero 0.2 J 	Numerical Application : $(ME) = (KE) + (PE)$ 800 J zero 800 J 
At midpoint (B) $KE = PE = \frac{1}{2} ME$ $ME = 2KE = 2PE$	0.2 J 0.1 J 0.1 J 	800 J 200 J 600 J 
At the moment the object reaches the original position (A) PE = zero ME = KE	0.2 J 0.2 J zero 	800 J 600 J 200 J 
	800 J 800 J zero 	
	Potential energy decreases and kinetic energy increases 	
	That means	
Mechanical energy of an object (ME)	=	Potential energy of this object at its maximum height
	=	Kinetic energy of this object at its original position or at the ground surface

-Despite the increase in potential energy of an object moving vertically upwards, its mechanical energy remains constant G.R. because the increase in the object's potential energy during vertical motion results in a decrease in kinetic energy by the same amount.

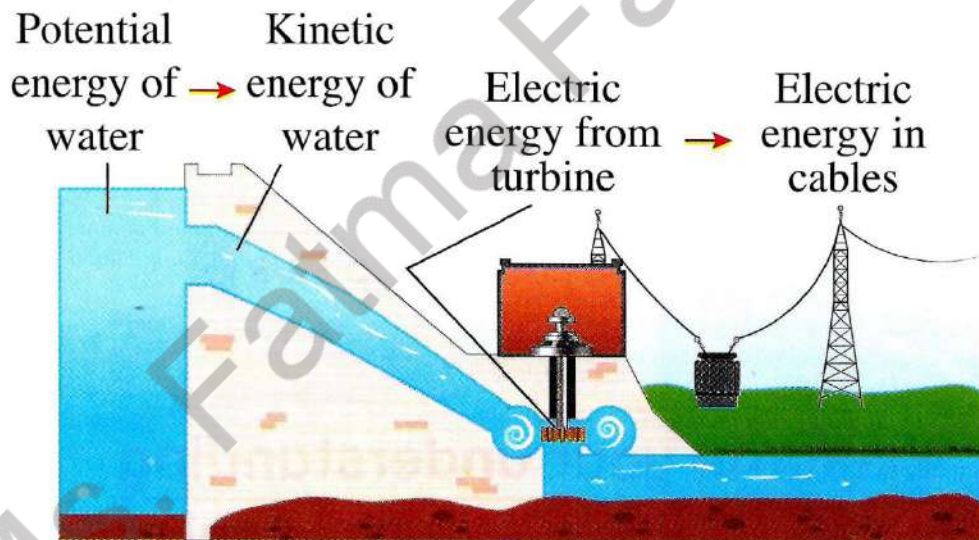
Medical Application

-Avoid lifting heavy objects above ground level in a manner that harms your spine, the load should be on leg muscles rather than the back to ensure a balanced distribution of weight.



Life Application

1- Generating electricity from the High Dam



-In High Dam of Aswan, the potential energy of the water held behind the dam is converted into kinetic energy when it rushes down.

-The kinetic energy of the water drives turbines that generate electricity in a sustainable way.



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2- Demolition Ball

-Demolition ball is used in demolishing old building as a result of converting the **potential energy** stored in the heavy ball which is suspended at a height into **kinetic energy** upon its release.

-The energy is transferred to the building upon the ball impact, causing its demolition.



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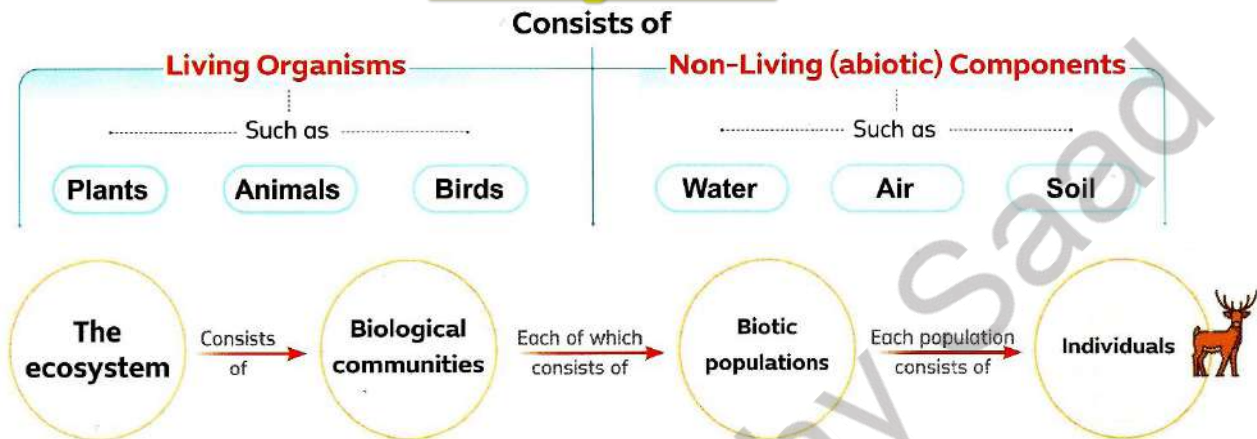
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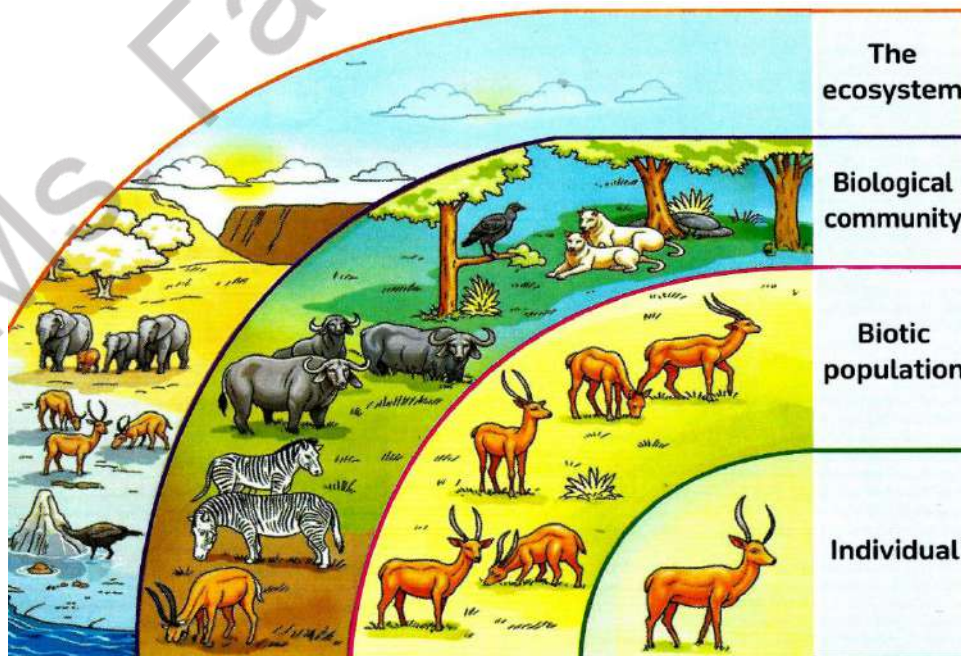


Unit (3)-Lesson 1: Nutritional Relationships in Biological Communities

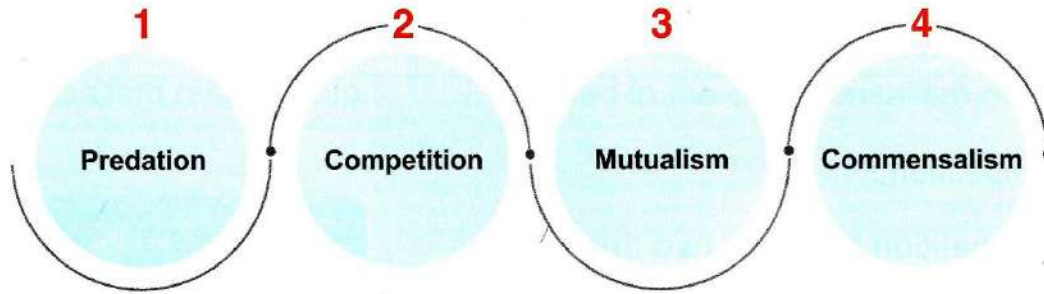
Ecosystem



Ecosystem	Any place that include living organisms and non-living components and includes several levels of organizations.
Biological communities	Various biotic populations of different species that inhabit the same environment.
Biotic populations	Group of individuals of the same species living in a particular place at the same time.
Individuals	Single living organism that belongs to a specific species of living organisms.



Patterns of Nutritional Relationships



1-Predation

Predation	A nutritional relationship between two individuals, one of them benefits and the other harmed or lose its live.
Predator (Beneficiary organism)	The individual that benefits from the predation relationship.
Prey (harmed organism)	The individual that is harmed or loses its life in the predation relationship.

Examples:

Predation of a zebra
by a lion



**Predator
(Beneficiary)**

**Prey
(Harmed)**

Lion

Zebra

Predation of an insect by
a panther chameleon



**Predator
(Beneficiary)**

**Prey
(Harmed)**

Panther
chameleon

Insect

Predation of an insect
by a Dionaea plant



**Predator
(Beneficiary)**

**Prey
(Harmed)**

Dionaea (Venus
flytrap) plant

Insect



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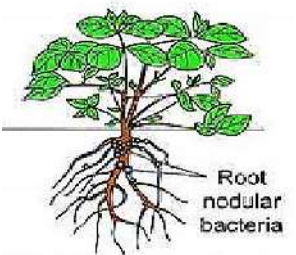
2-Competition

Competition	A nutritional relationship between two individuals of the same species for a food resource that exist in limited quantities which negatively impact their growth or survival.
Both individuals are harmed .	
<u>Examples:</u>	
Competition between two lions for obtaining food (Zebra) In which both individuals are harmed →  The competition between two lions	

-What happens when, decreasing of food resources for individuals of the same biotic population?

Competition among them increases, which affects their numbers.

3-Mutualism

Mutualism	A nutritional relationship between two, both of them benefit from each other without causing harm to either of them.
Both individuals are benefits .	
<u>Examples:</u>	
The nutritional relationship between been plants and root nodular bacteria In which both organisms benefit → Plant: benefits by obtaining suitable nitrogenous compounds By the action of nodular bacteria. Nodular bacteria: Benefits from obtaining food resulting from Photosynthesis process and obtaining habitat or suitable environment for life.  The mutualism between bean plants and nodular bacteria	



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4-Commensalism

Commensalism	A nutritional relationship between two individuals, one of them benefits and the other neither benefits nor is harmed.
Commensal	The individual that benefits from the commensalism relationship.
Host	The individual that is neither benefits nor is harmed in the commensalism relationship

Examples:

Commensal: Plover bird that benefits by feeding on leftover food that get trapped between crocodile's teeth.

Host: Crocodile that neither benefits nor is Harmed.



-The crocodile does not benefit from its relationship with plover bird G.R.
because it can live without cleaning its teeth from leftover food.

Living organisms in biological community

Producers	Consumers	Decomposers
Autotrophic organisms that can make their own food through the photosynthesis process	Heterotrophic organisms that depend directly or indirectly on other producers for obtaining their food.	Living organisms that obtain their food from breaking down of the organic substance found in dead bodies into simpler substances.
e.g. plants and algae	e.g. animals	e.g. bacteria and fungi



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Consumers are classified into

<u>Herbivores</u> <u>Plant - Eaters</u>	They feed on plants only. Characterized by the presence of incisors G.R. for cutting plants. e.g. horse and rabbit   Horse Rabbit
<u>Carnivores</u> <u>Meat - Eaters</u>	They feed on meat only. Characterized by the presence of sharp canines G.R. for tearing prey. e.g. Lion and snake.   Lion Snake
<u>Omnivores</u>	They feed on both meat and plants. e.g. bear, raven, mouse and hedgehog  
<u>Scavengers</u>	They feed on the remains of dead organisms. e.g. Hyenas, eagles and Cockroaches.   Hyena is a scavenger Eagle is a scavenger



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-Decomposers are known by this name G.R. because they decompose the organic substances found in bodies of dead organisms into simpler substances which mix with the soil.

Energy Flow Among Living Organisms

First
Food chains

Second
Food webs

First: Food Chains

-Food chain: It is the path of energy in the form of food as it moves from one living organism to another within the ecosystem.

-Trophic level: Each stage in which energy is transferred in the food chain.

Any food chain consists of

1

Producer

occupying the first trophic level



2

Consumers

occupying the higher trophic levels above the first level



3

Decomposer

obtains its energy from any dead organism in the trophic level



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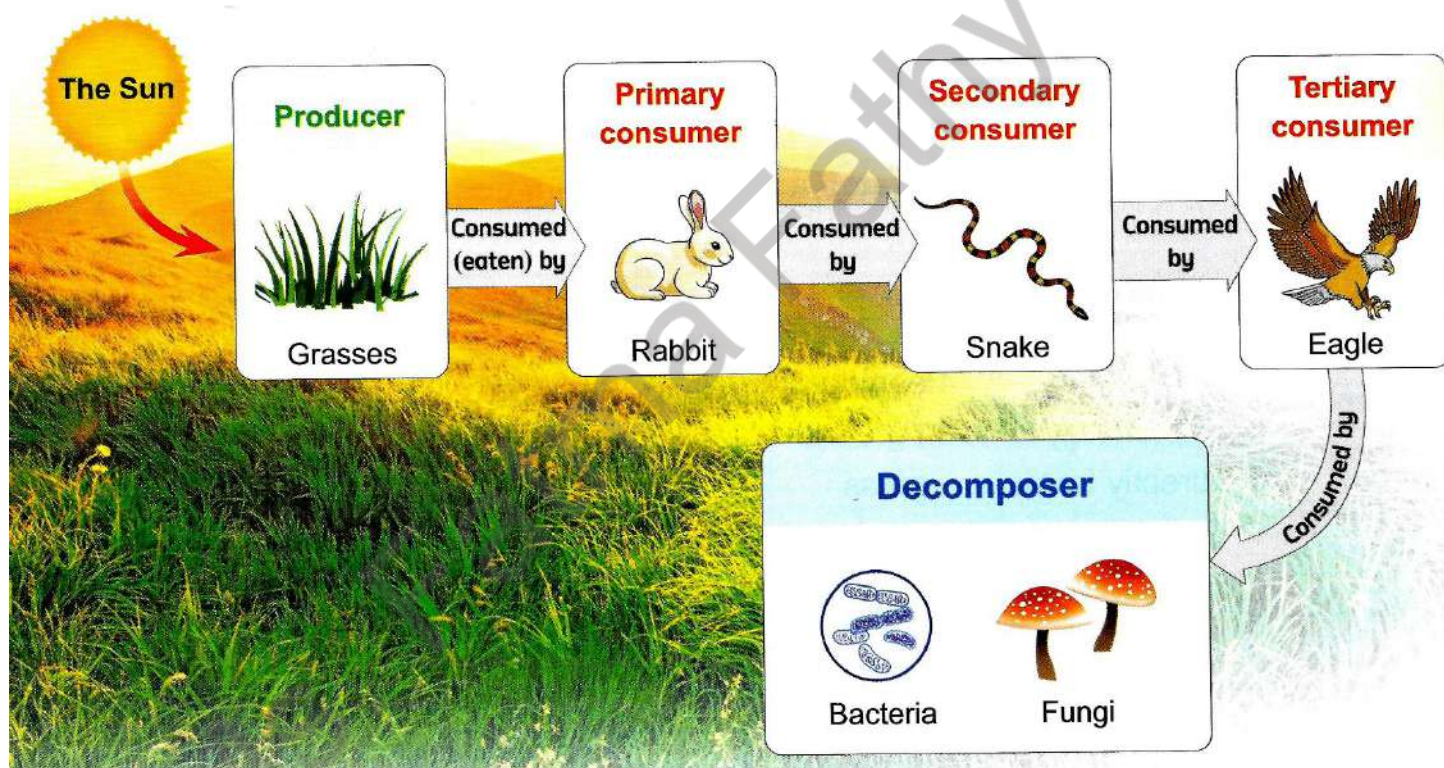




Grass	Locust	Frog	Snake	Fungus
Producer	1ry consumer Herbivores	2ry consumer Carnivores	3ry consumer Carnivores	Decomposer
Obtains energy directly from sun	Feed on producers (grass)	Feed on primary consumer (Locust)	Feed on Secondary consumer (Frog)	Feed on producers or consumer after death.

Types of food chains

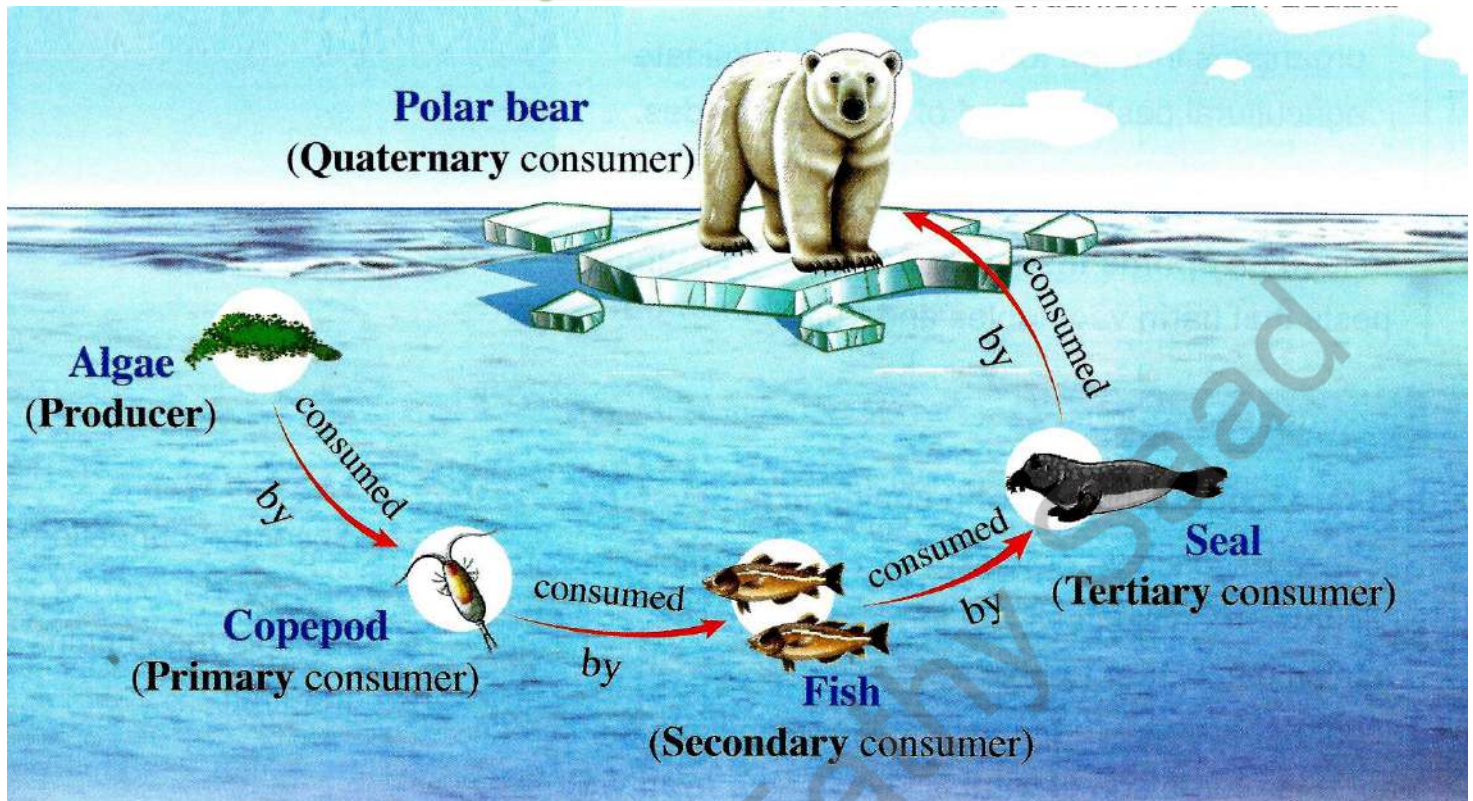
1-Terrestrial Food chain



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2-Aquatic Food chain



In this food chain...

Grasses → Rabbit → Snake → Eagle → Bacteria or fungi

1-Grass is described as autotrophic organism or producer G.R. because it can make its own food through photosynthesis process.

2-The rabbit is considered as primary consumer G.R. because it obtains energy by feeding on grass (producer)

3-The snake is secondary consumer G.R. because it obtains energy by feeding on the rabbit that is primary consumer which represents a herbivore.

4- The eagle is a tertiary consumer G.R. because it obtains energy by feeding on the snake that is secondary consumer which represents a carnivore.

5-Bacteria and fungi are called decomposers G.R. because they break down organic substances found in dead organisms into simpler substances.



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Note: In some food chains certain animals play the roles of both predators and prey at the same time.

Sustainable Agriculture

-Biological control: A method in which utilization of living organisms through food systems to eliminate agricultural pests instead of using pesticides.

Example:

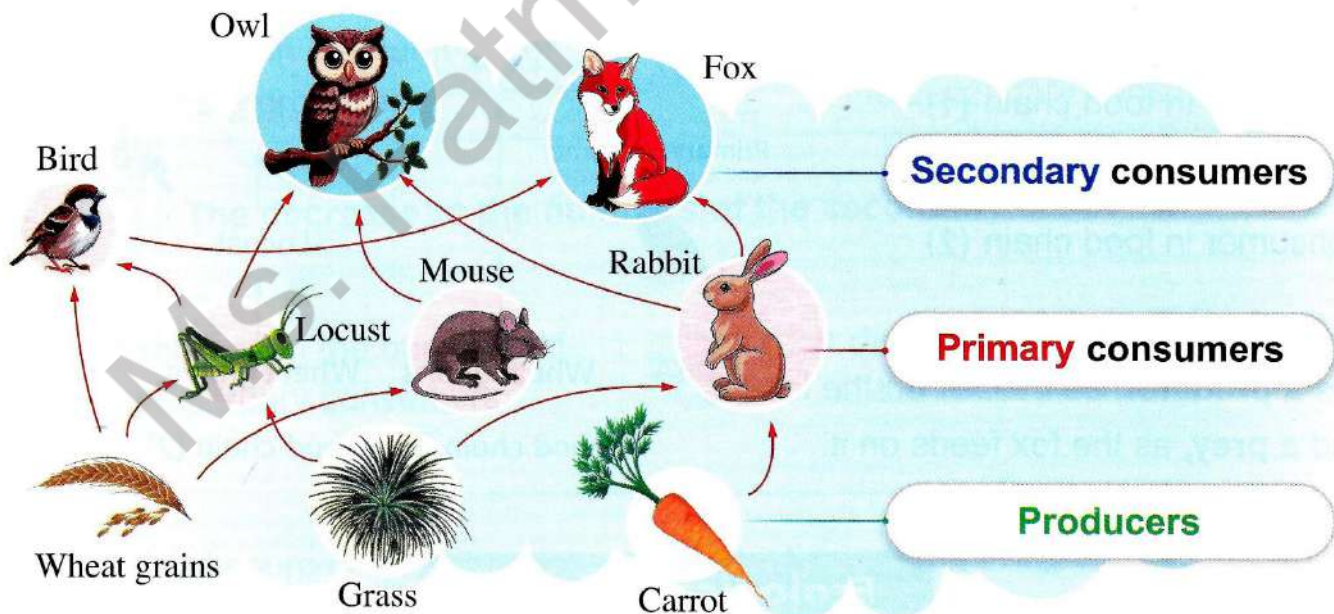
Dotted beetle or lady bug feeds on aphid insects that is one of the agricultural pests that harm vegetables and fruits.



Second: Food Webs

Food Web: The interconnection and overlapping of multiple food chains together.

-It is rare to find isolated food chains in ecosystem G.R. because each single organism can feed on multiple sources while this organism itself is a food source for several other organisms at higher trophic levels.



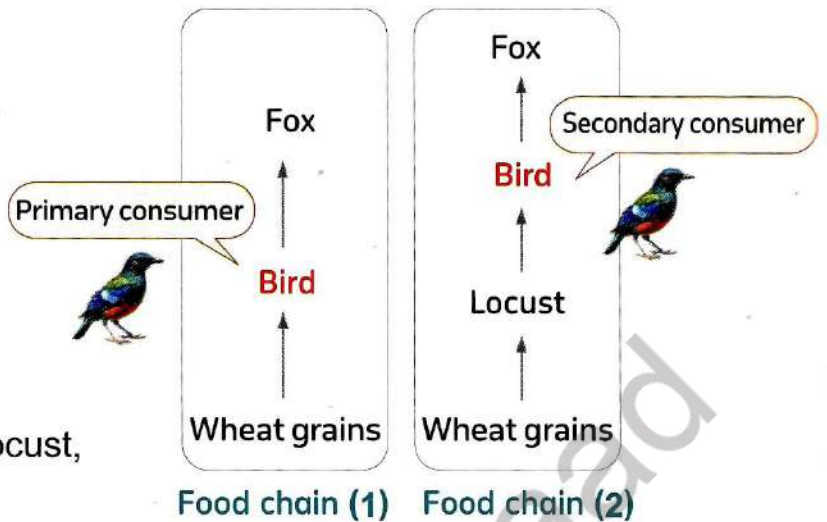
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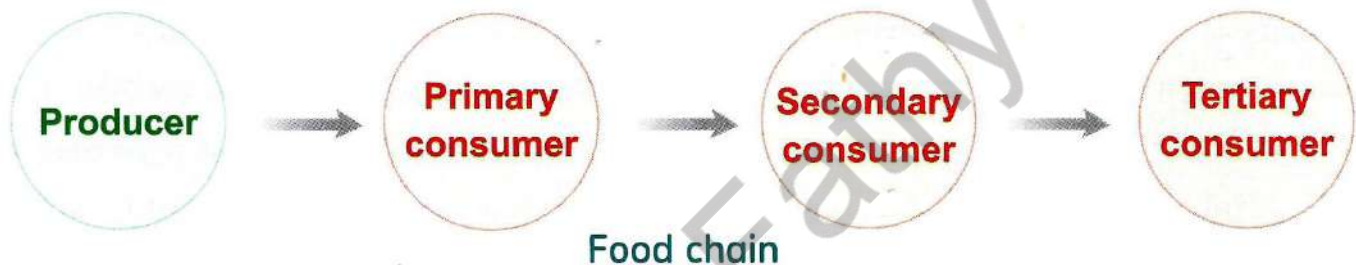
The bird :

- ▶ Is considered **a primary** consumer in food chain (1).
- ▶ Is considered **a secondary** consumer in food chain (2).
- ▶ In the food chain (2)

It is **a predator**, as it feeds on the locust, and **a prey**, as the fox feeds on it.



Ecological Balance



The increase in the numbers of the primary consumers

leads to _____

A decrease in the numbers of the producers

And

An increase in the numbers of the secondary consumers



The decrease in the numbers of the secondary consumers

leads to _____

An increase in the numbers of the primary consumers

And

A decrease in the numbers of the tertiary consumers



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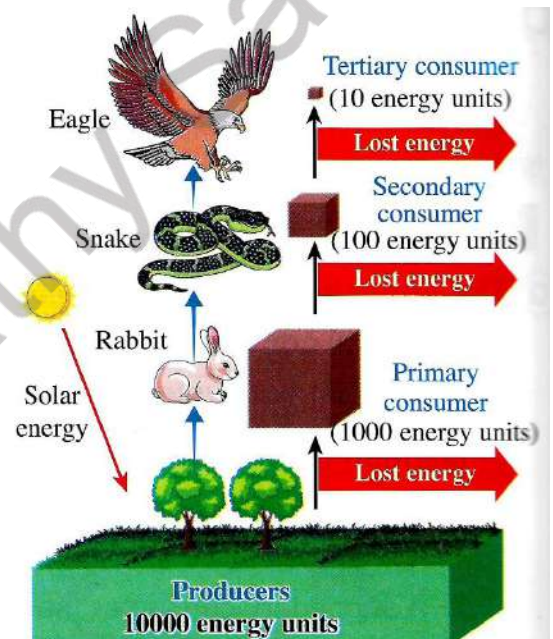
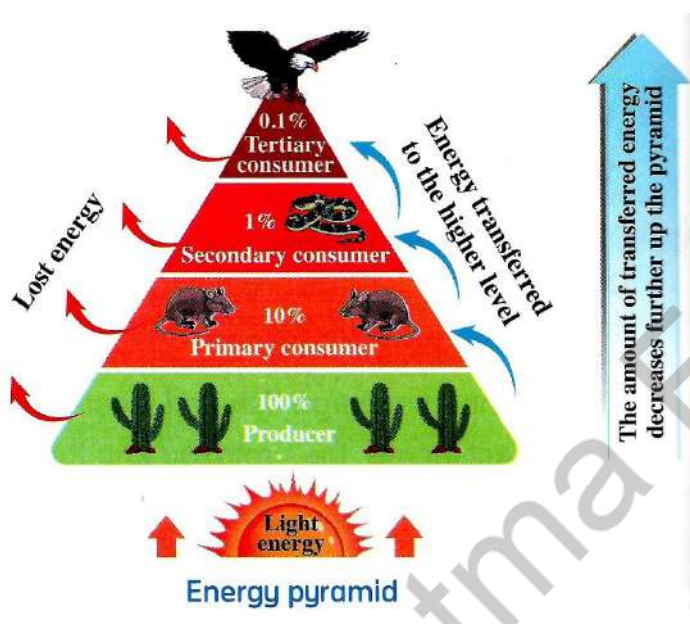


Note: Lack of resources leads to increase competition among living organisms which affects the number of individuals in the biotic population.

Energy Pyramid

Energy Pyramid: A pyramid represents the flow of energy and its amounts between the different trophic levels in any food chain.

- The **base** of pyramid occupies by **producers**.
- The **apex** of pyramid occupies by **last consumer** (Top predator).



-Only 10% of energy is transferred from the living organisms at any trophic level to the living organisms which occupy the next trophic level in the energy pyramid.

-This means that 90% of energy is lost when moving from any trophic level to the next level.



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Unit (3)-Lesson 2: Genetic Traits and Mutations

Genetic traits and Acquired traits

Genetic traits	Acquired traits	Instinctive Behaviors
Transmitted from parents to offspring without learning and inherited from generation to the next	Not inherited acquired from the environment through learning and training.	Skills transmitted from parents to offspring without learning
Examples:		
-Human hair colour. -Eye color. -Short legs of arctic fox. -length of giraffe neck -Prescience of hard skeleton covering turtle's body.	-Child learning to walk. -Building strong muscles -Dolphin playing with ball -learning language. -Horse jumping over obstacles.	-Bat sleeping upside down. -Chicken laying on eggs. -A squirrel breaking hazelnut shell. -Spider weaving its web to catch insects. -Bird building its nest.

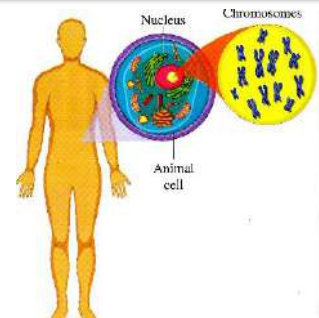
Chromosomes and the transmission of genetic traits.

-Reproduction: A vital process aims to produce new individuals that resemble their parents.

-Chromosomes: Thread-like bodies that represent genetic material in eukaryotes that are responsible for the transmission of genetic traits from parents to offspring.

-Genetic material (Chromosomes) is found in:

Eukaryotes	Prokaryotes
In nuclei	In cytoplasm



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- Individuals of same species have the same number of chromosomes in somatic cell.
- Each individual inherits half of its chromosomes from the father and the other half from the mother.

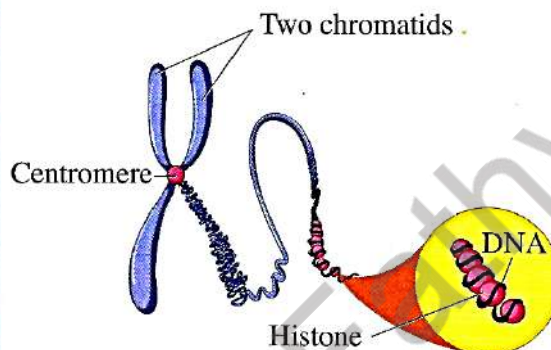
Living organism	Human	Bee	Corn plant
Number of chromosomes	46	32	20

Structure of chromosomes

1

General composition

Each chromosome consists of two threads, each called a chromatid, the two chromatids are connected at a central point known as the centromere



2

Chemical composition

The chromosome is chemically composed of nucleic acid abbreviated as DNA, wrapped around a type of protein known as histones

Centromere: It is the central point at which the two chromatids of the chromosome are connected.

Chemical structure of DNA

-Genes: Segments of the nucleic acid DNA found in chromosomes, they are responsible for the appearance of the hereditary traits in the living organisms.

-Nucleotides: The smallest building unit of the nucleic acid DNA

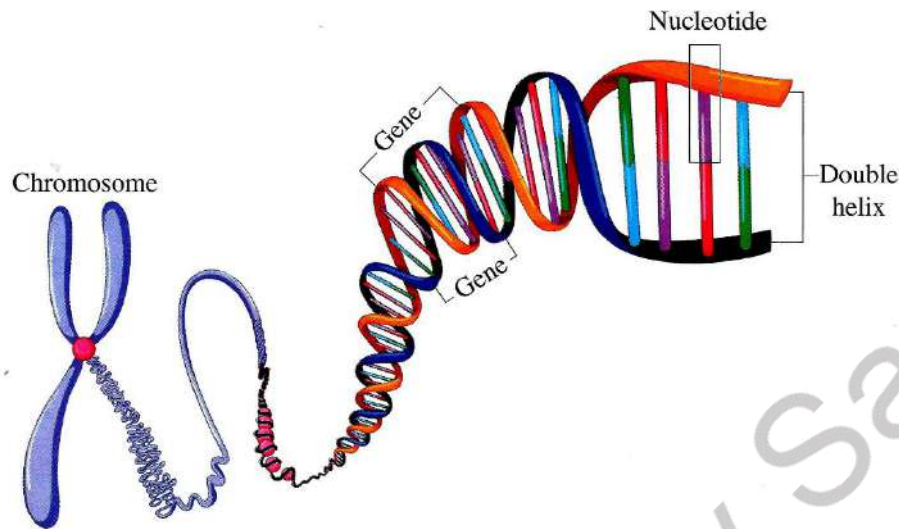
-Double Helix: The sequence of nucleotides which exist in the form of two strands twisted around each other.



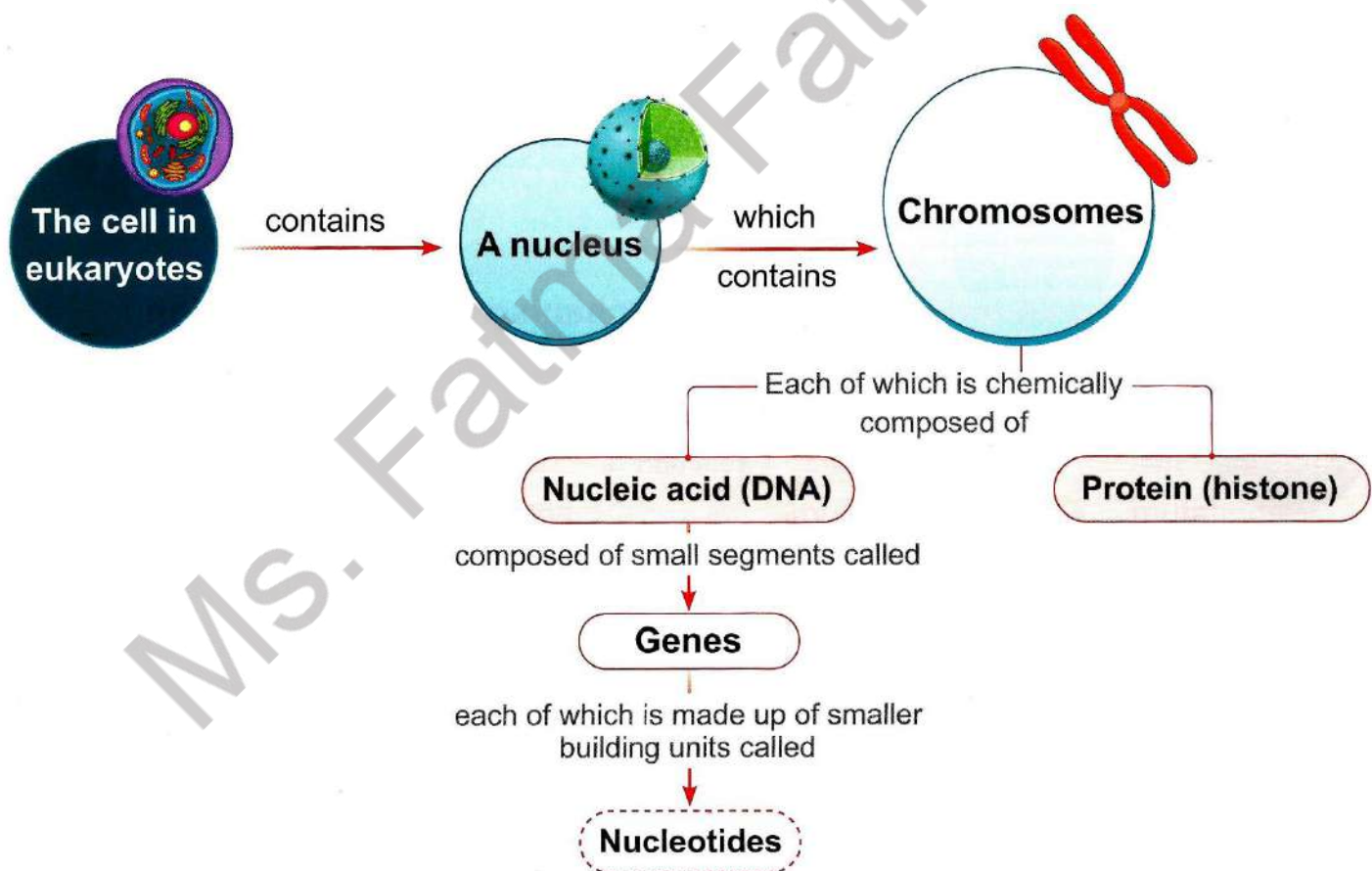
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- DNA made up of small segments called genes.
- Each gene consists of sequence of nucleotides
- Nucleotides are arranged in double helix.



- Single chromosome carries thousands or millions of genes.



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The role of genes in expression of hereditary traits

Genetics: The science that studies the transmission of genetic traits from parents to offspring.

-Gregor Mandel is considered the founder of the science of genetics.



Beadle and Tatum

One gene – one enzyme hypothesis

States that each **gene** produces a specific **enzyme**, this enzyme is responsible for the occurrence of a **chemical reaction**, that leads to the formation of a **protein** that expresses a specific hereditary trait.



Beadle



Tatum



-The inheritance of curly hair trait:

- 1-When individual inherit **gene** responsible for appearance of curly hair trait from one of their parents.
- 2-Gene produces a specific **enzyme**.
- 3-The enzyme is responsible for a **chemical reaction**.
- 4-Chemical reaction form a **protein** that express curly hair trait.



Curly hair

-What is the result of the difference in the arrangement of the nucleotides on DNA?

The genes present on a single chromosome differ, leading to the difference in the hereditary trait that each gene is responsible for expressing.



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Mutations

Mutation: The emergence of new hereditary trait that did not previously exist as a result of a change in the nature of the gene responsible for it.

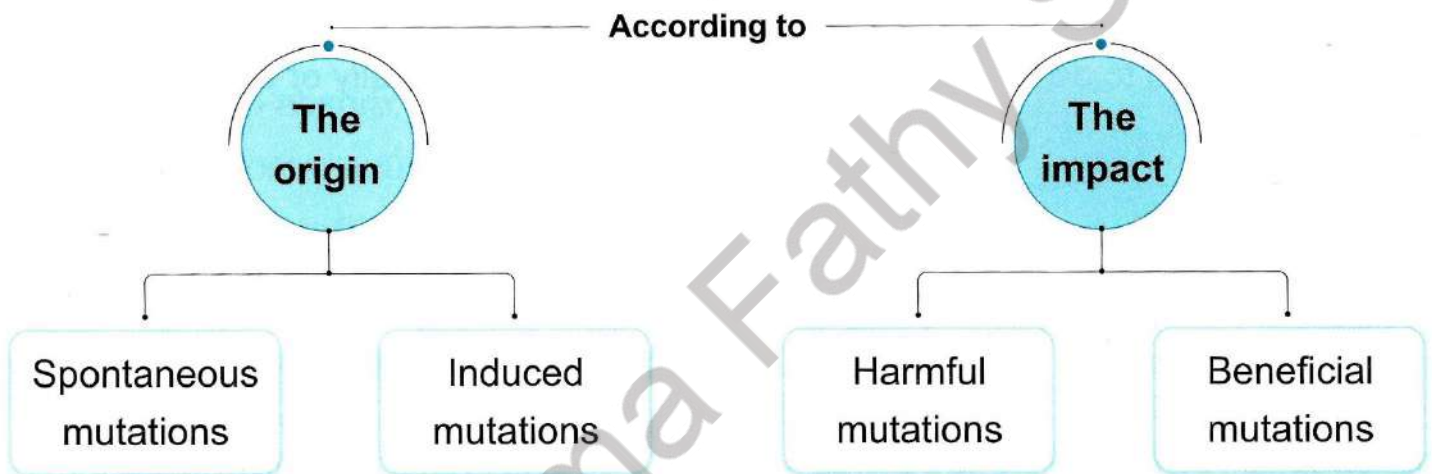
-Examples of mutations:

The creation of huge types of cows.

-The birth of an individual with a six fingers on hand.



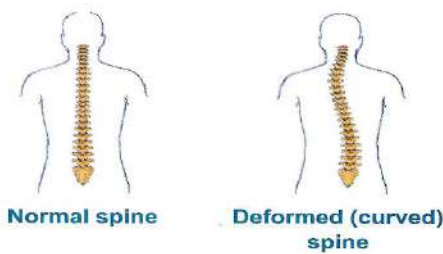
Types of Mutations



A-According to Origin

Spontaneous Mutation	Induced Mutation
That occur naturally without human intervention	Occur through human intervention
Examples	
<u>(albinism or albino mutation)</u> A dark skinned mother giving birth to albino child	Production of featherless chicken G.R. to reduce the electrical energy used in air conditioning in farms in hot regions
	

B-According to impact

Harmful Mutation	Beneficial Mutation
Cause the appearance of new undesirable trait, some of them may lead to death.	Cause the appearance of new desirable trait whether occurring naturally or through human intervention
Examples	
-Spinal deformity  Normal spine Deformed (curved) spine	<u>(spontaneous mutation)</u> -The change in skin color G.R. to adapt the environment in cold countries which help individuals to absorb vitamin D.
-Sever muscular dystrophy (wasting and weakness of the muscles)  Severe muscular dystrophy	<u>(Induced mutation)</u> -Production of seedless fruits. -Production of wheat plants resistant to wheat rust disease.

-The production of cubic-shaped watermelons is not considered as a an agricultural technique not a mutation G.R. because it is achieved by placing the watermelon in a square mold during its growth causing it to take the shape of the mold to facilitate their transportation.



Cubic-shaped watermelon



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Lactose Tolerance

(Beneficial Spontaneous Mutation)

-Lactose tolerance: it is a mutation in which allow lactose sugar found in milk and dairy products to be converted into simpler sugars that are easier for body to absorb.

-People suffers from **lactose intolerance** feel crampy, nausea and other painful symptoms when drinking milk or eating dairy products.

-They avoid mild dairy products by using alternatives that do not cause these symptoms:



Dairy products alternatives

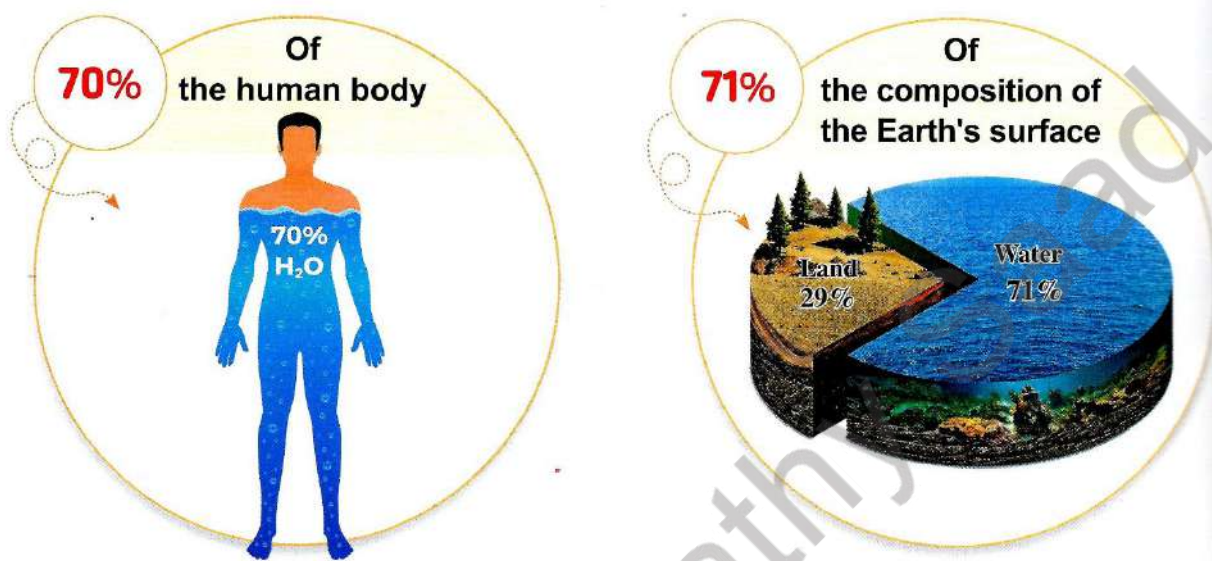


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Unit (4)-Lesson 1: Water Cycle

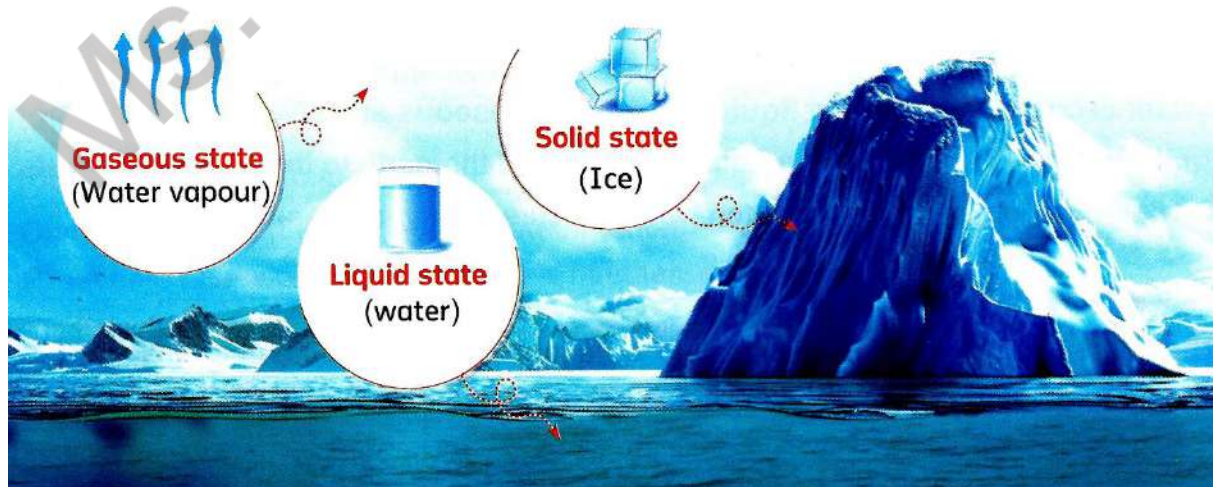
Water



-Conservation and the prudent use of fresh water is essential G.R. because Fresh water is limited amount as it represents approximately 3% only of the water available on the Earth's surface and to insure its sustainability in the future.

-Uses of water: drinking, agriculture, sanitation, hygiene and also regulating the temperature of the Earth planet.

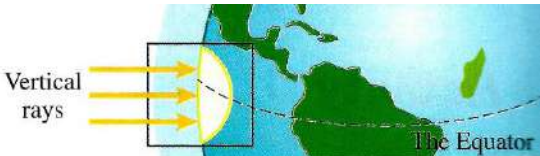
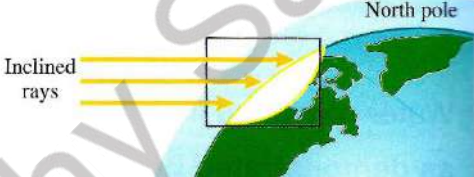
States of Water



1-Evaporation

-Evaporation: The conversion of water from the liquid state to the gaseous state upon gaining heat at any temperature.

-The rate of evaporation in tropical regions is faster than in polar region G.R. due to the fact that:

<u>Tropical regions</u>	<u>Polar regions</u>
Sunlight rays are vertical and have great effect of heat	Sunlight rays are inclined and so their heat is distributed over a large area resulting in a lesser effect.
	

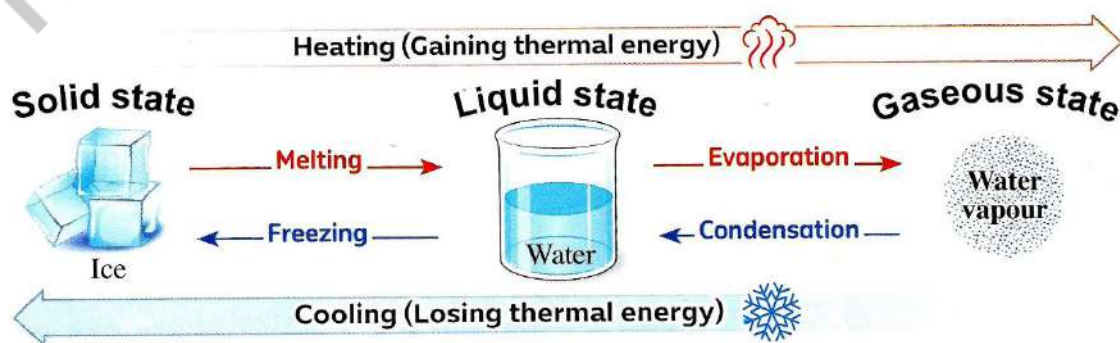
Evaporation vs Boiling

	<u>Evaporation</u>	<u>Boiling</u>
<u>Differences</u>	Occurs at any temperature	Occurs at certain temp 100° C
<u>Similarity</u>	Water converts from liquid state to water vapor	

-Boiling point is a characteristic property of a pure substance unlike the evaporation process G.R. because each substance has its own boiling point while evaporation occurs at any temperature.

2-Condensation

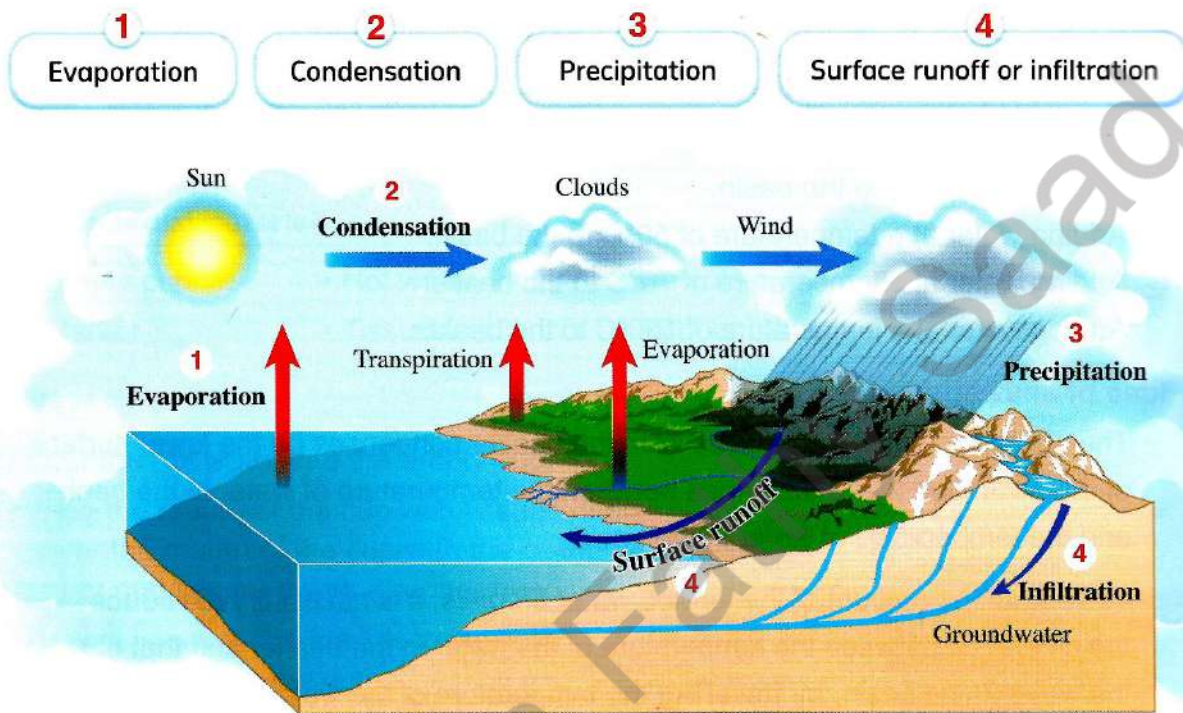
-Condensation: The conversion of water upon losing heat from the gaseous state to the liquid state at any temperature.



The water cycle in nature

Water cycle: A natural process involving the movement of water between the atmospheric air and the Earth in a closed multi-path cycle.

There are four main pathways that constitute the water cycle in nature, which are :



Sources of water vapor in nature

The evaporation of water from large water bodies

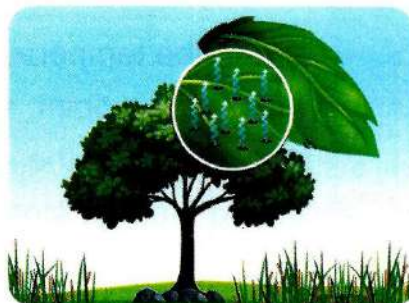
Such as rivers, seas and oceans



The process of transpiration in plants

Transpiration

The process by which plants lose water in the form of water vapour.



The evaporation of water of perspiration (sweat)

Which is secreted by human and animals

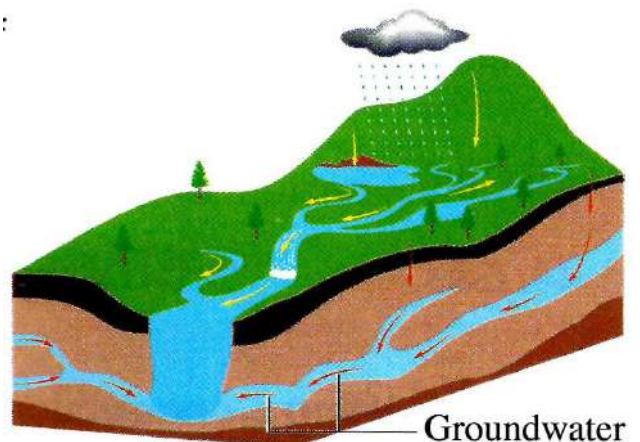
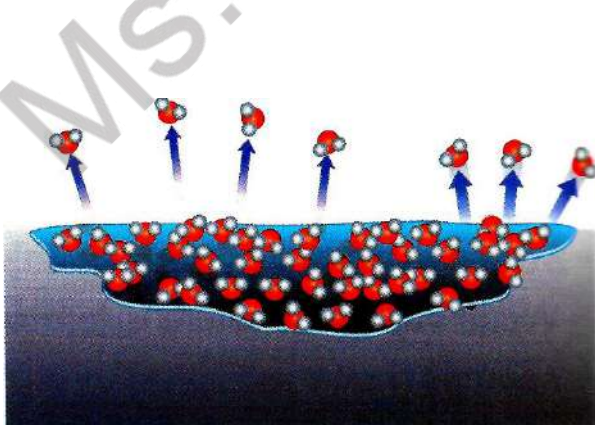


Water Cycle

Evaporation	The conversion of water from the liquid state to the gaseous state upon gaining heat at any temperature
Condensation	The conversion of water upon losing heat from the gaseous state to the liquid state at any temperature
Precipitation	This is the process by which water from clouds fall to the Earth's surface in the form of rain, snow or hail by the effect of Earth's gravity.
Surface runoff	This is the process of rainwater flowing across the Earth's surface and into rivers, seas and lakes due to the effect of the Earth's gravity.
Infiltration	The process of infiltration of rainwater into the ground and stored as a groundwater.

- 1-Energy derived from sun cause evaporation of water on the surface of the Earth.
- 2-Air current carry water vapour upward that loses energy and its temperature decreases causing condensation.
- 3-The tiny water droplets accumulate together forming larger and heavier drops of water.
- 4-Precipitation occurs as heavy water drops from clouds returning back to the Earth due to gravity effect.

<u>Type of Precipitation</u>	<u>case</u>
Rain	Temperature above freezing point
Snow	Temperature below freezing point
Hail	Small ice crystals accumulates during thunder storm



-The main factors that maintain continuity of the water cycle in nature:

1

Heat of the sun

The heat of the sun causes water to move from **the Earth to the atmospheric air** through the process of **evaporation**

This preserves the balance of the ecosystem

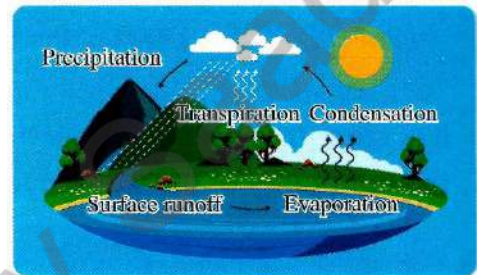
2

Earth's gravity

The gravity of the Earth causes the water to return back to **the Earth** again through the process of **precipitation**

-Water forms a comprehensive ecosystem where various pathways interact periodically.

-Understanding the model of water and their impact on the environment enhances our understanding of natural processes and helps in predicting future changes.

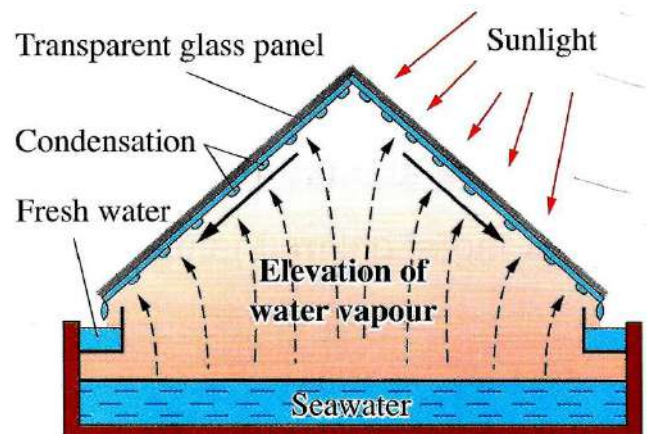


Desalination of Seawater

Desalination of Seawater: The process of removing dissolved salts from seawater to convert it into fresh water.

-Working principle: Evaporation and condensation using a seawater desalination device shown in the opposite figure.

-Importance: The process of water desalination plays a significant role in facing shortage of fresh water resources suitable for drinking and irrigation particularly in remote areas.



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April Exam Revision

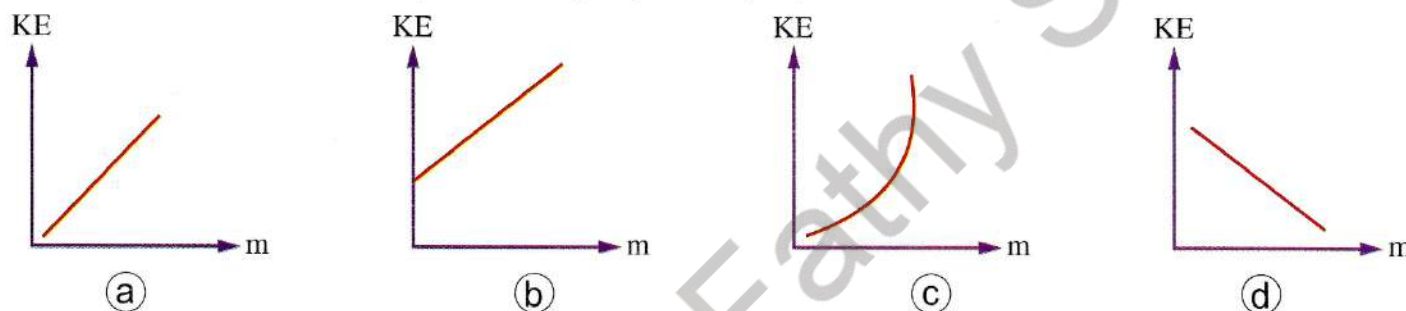


-Choose the correct answer:

What happens to the dependent variable in scientific comparative experiments?

- (a) It changes with the change of the independent variable.
- (b) It changes with the change of the controlled variable.
- (c) It does not change with the change of the independent variable.
- (d) It does not change with the change of the controlled variable.

The relation between the kinetic energy and the mass for several objects at constant speed is expressed graphically by



The kinetic energy of an object depends on

- (a) the weight of the object and its height.
- (b) the mass of the object and its speed.
- (c) the gravitational field intensity and the speed.
- (d) distance and time.

The kinetic energy of any moving object is determined by the mathematical relation

- (a) mgh
- (b) $\frac{1}{4} mv^2$
- (c) $\frac{d}{t}$
- (d) $\frac{1}{2} mv^2$

Joule is the measuring unit of kinetic energy and it is equivalent to

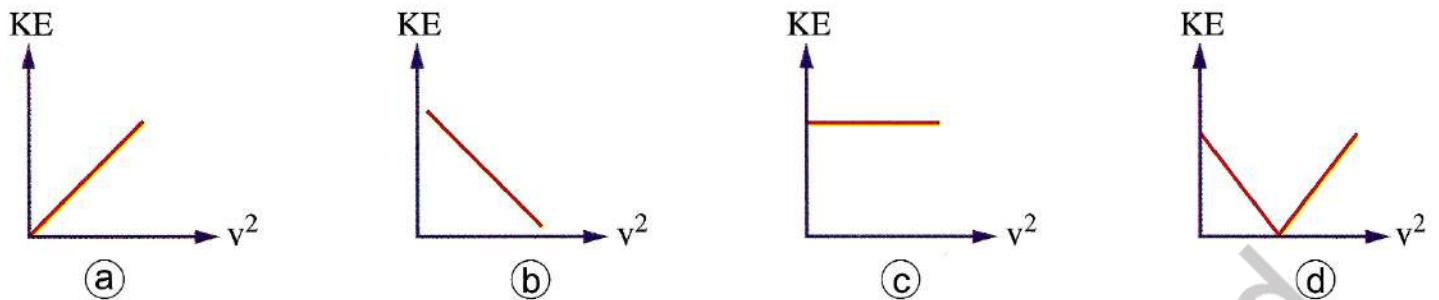
- (a) g/cm^3
- (b) N
- (c) $kg \times (m/s)^2$
- (d) kg/s^2



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The graph represents the relation between the kinetic energy of an object (KE) and the square of its speed (v^2) while its mass remains constant.



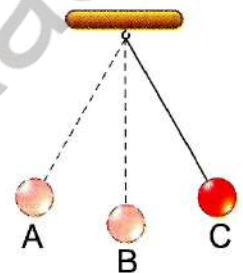
In the figure:

1- The work done on the ball at point (A) is stored in form of

- (a) potential energy.
- (b) kinetic energy.
- (c) thermal energy.
- (d) chemical energy.

2- When a pendulum ball passes through point (B), the work done at it equals

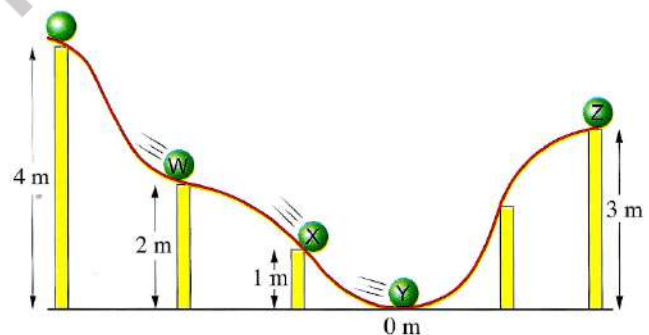
- (a) thermal energy.
- (b) chemical energy.
- (c) kinetic energy.
- (d) potential energy.



3- The opposite figure illustrates a ball that rolls down a slope.

Which of the following is correct ?

- (a) The potential energy of the ball at (X) is greater than at (Z).
- (b) The kinetic energy of the ball at (Y) is greater than that at (W).
- (c) The potential energy and the kinetic energy are equal at (X).
- (d) The potential energy and the kinetic energy are at their maximum at (Z).



4- At the maximum height reached by an object thrown upwards,

- (a) potential energy is zero.
- (b) kinetic energy is zero.
- (c) mechanical energy is zero.
- (d) the mass of the object is zero.

When an object falls vertically from a height, its mechanical energy at any point before reaching the ground is expressed as

- (a) kinetic energy only.
- (b) potential energy only.
- (c) kinetic energy - potential energy.
- (d) potential energy + kinetic energy.

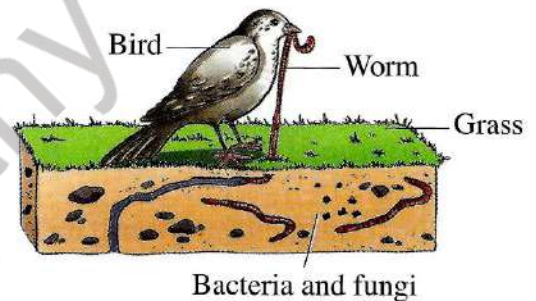
Each of the following has a value of zero, except

- (a) kinetic energy of an object at the point of its falling.
- (b) potential energy of an object at the moment it reaches the ground surface.
- (c) speed of an object at its maximum height.
- (d) mechanical energy of an object at the moment it reaches the ground surface.

The opposite figure shows several different living organisms living in a certain place.

The worms in this environment represent

- (a) a biological community.
- (b) an ecosystem.
- (c) a biotic population.
- (d) a biosphere.



Each of the following food relationships represents predation, except the relationship between

- (a) lion and zebra.
- (b) Dionea plant and insect.
- (c) Nile crocodile and plover bird.
- (d) wolf and wild rabbit.

Predators of the same species which live in the same ecosystem

- (a) become decomposers.
- (b) compete for food.
- (c) make their own food.
- (d) obtain their energy from the sun.



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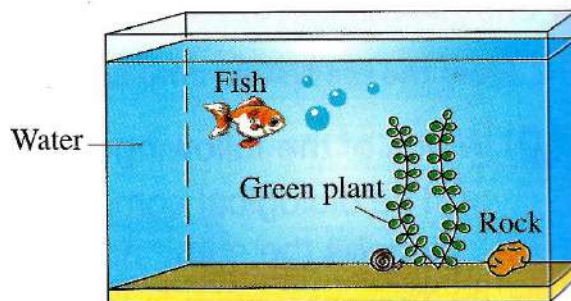
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From the opposite figure:

What is the consumer in this aquarium ?

- (a) Water.
- (b) Green plant.
- (c) Fish.
- (d) Rock.



Herbivores are

- (a) producers.
- (b) scavengers.
- (c) consumers.
- (d) decomposers.

Among the living organisms that obtain their food from plants and animals are

- (a) eagles and hyenas.
- (b) snake and cow.
- (c) rabbit and mouse.
- (d) hedgehog and bear.

The animal (X) feeds on small animals and the roots of plants, thus it is classified as a (an)

- (a) omnivore.
- (b) scavenger.
- (c) rodent.
- (d) decomposer.

Decomposers in food chains

- (a) make their food through photosynthesis.
- (b) recycle the nutrients to the ecosystem.
- (c) absorb energy from the sun.
- (d) produce new food substances.

Which of the following indicates the correct path of energy in a food chain ?

- (a) Grass → Cow → Human → Sun.
- (b) Sun → Grass → Cow → Human.
- (c) Human → Cow → Grass → Sun.
- (d) Cow → Grass → Sun → Human.



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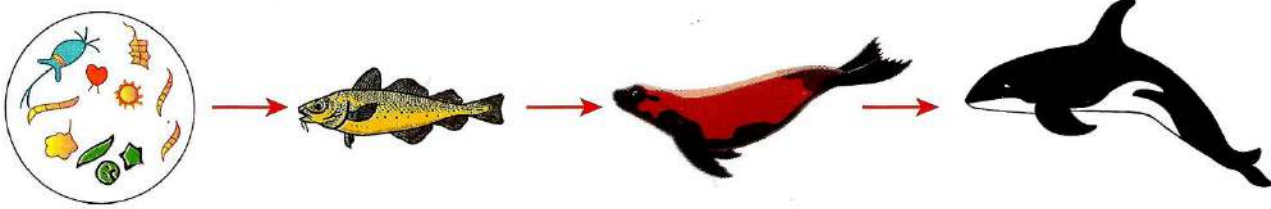
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From the following figure:



What does the arrow represent ?

- (a) The path of energy flow.
- (b) The replacement of one biological community with another.
- (c) The increase in numbers of the living organisms.
- (d) The decrease in food sources.

Which of the following obtain energy from the other three types ?

- (a) Producers.
- (b) Decomposers.
- (c) Carnivores.
- (d) Herbivores.

In the following food chain :



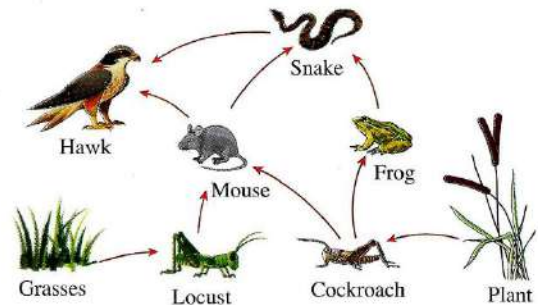
Which of the following is correct ?

- (a) Organism (2) is a carnivore.
- (b) Organism (2) is a secondary consumer.
- (c) Organism (3) is a carnivore.
- (d) Organism (3) is a tertiary consumer.

In the food web illustrated in the opposite figure :

1– Energy flows from

- (a) hawk → mouse → locust → grasses.
- (b) grasses → cockroach → hawk → frog.
- (c) locust → cockroach → frog → snake.
- (d) plant → cockroach → mouse → hawk.



2– Which of these living organisms is considered both prey and predator at the same time ?

- (a) cockroach.
- (b) Locust.
- (c) Frog.
- (d) Hawk.



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In the opposite food chain :

1– The absence of owls leads to



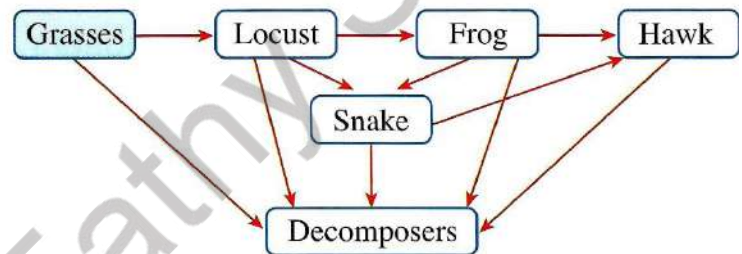
- (a) the preservation of ecological balance.
- (b) an increase in the numbers of snakes.
- (c) an increase in the numbers of mice.
- (d) a decrease in the numbers of young chickens.

2– How many consumers are found in this food chain ?

- (a) 2
- (b) 3
- (c) 4
- (d) 5

In the opposite food web :

Which of the following organisms obtain energy from the same food source ?

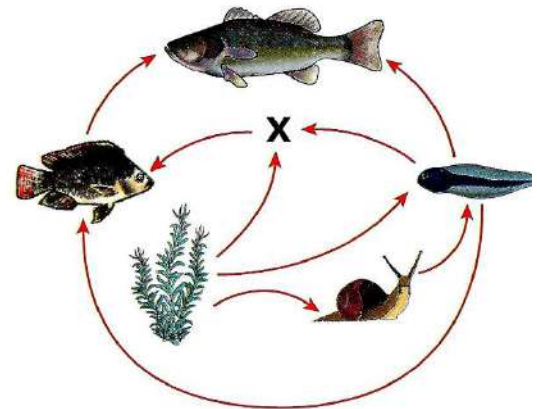


- (a) Locust and snake.
- (b) Hawk and frog.
- (c) Frog and snake.
- (d) Decomposers and grasses.

In the food web illustrated in the opposite figure :

(X) represents

- (a) a herbivore.
- (b) a carnivore.
- (c) an omnivore.
- (d) a producer.



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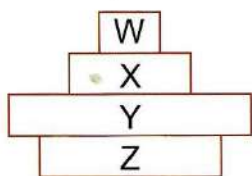
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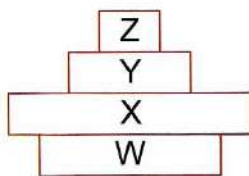
The following diagram illustrates a food chain :



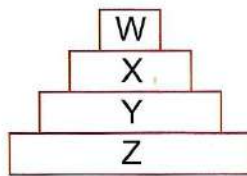
Which of the following shows the energy pyramid that represents this chain ?



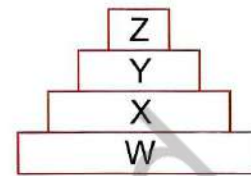
(a)



(b)



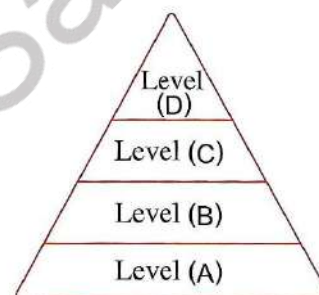
(c)



(d)

The opposite diagram represents an energy pyramid in which the organisms of level (A) obtain their energy from

- (a) the producers.
- (b) organisms of level (B).
- (c) the sun.
- (d) organisms of level (D).



The amount of energy lost when moving from any trophic level to the next level in the energy pyramid equals

- (a) 1%
- (b) 10%
- (c) 90%
- (d) 100%

In a food chain, if the energy of the producer is 1000 energy units, then the energy of the secondary consumer equals energy units.

- (a) 1000
- (b) 100
- (c) 10
- (d) 0.1

Millions of nucleotides come together directly, forming

- (a) chromosomes.
- (b) chromatids.
- (c) genes.
- (d) histones.

What is the composition of the mixture which is used to separate strawberry chromosomes?

- (a) Salt, dishwashing liquid and water only.
- (b) Salt, ethyl alcohol and water only.
- (c) Dishwashing liquid and ethyl alcohol only.
- (d) Salt, dishwashing liquid and ethyl alcohol.

The number of chromosomes in corn plant cells equals chromosomes.

- (a) 20 (b) 26 (c) 32 (d) 46

The central point at which the two chromatids of the chromosome are connected is called

- (a) the nucleotide. (b) the centrosome. (c) the gene. (d) the centromere.

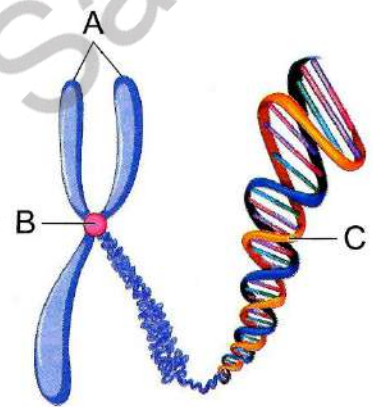
Histones are

- (a) enzymes. (b) proteins. (c) fats. (d) carbohydrates.

From the opposite figure :

Which of the following represents each of (A), (B) and (C) ?

Choices	(A)	(B)	(C)
(a)	Chromosome	Nucleotide	DNA
(b)	DNA	Centromere	Nucleotide
(c)	DNA	Nucleotide	Gene
(d)	Chromatids	Centromere	DNA



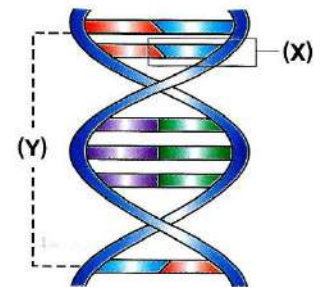
From the opposite figure :

1- The part referred to by the letter (X) is a

- (a) chromatid. (b) chromosome.
(c) histone. (d) nucleotide.

2- Which of the following statements is correct about the part referred to by the letter (Y) ?

- (a) The smallest building unit of the nucleic acid DNA
(b) Responsible for the appearance of a hereditary trait of the living organism.
(c) A type of protein.
(d) Absent in prokaryotes.



The two scientists who affirmed the hypothesis of one gene - one enzyme through their experiments are

- (a) Beadle and Crick. (b) Mendel and Tatum.
(c) Beadle and Tatum. (d) Watson and Crick.

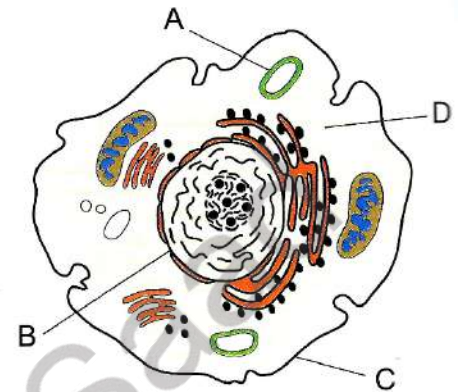
Genes control the appearance of hereditary traits in the living organism by producing

- (a) hormones. (b) enzymes. (c) chromosomes. (d) vitamins.

From the opposite figure of the cell :

The genetic material that the cell uses it in the production of various proteins is found in

- (a) (A). (b) (B).
(c) (C). (d) (D).



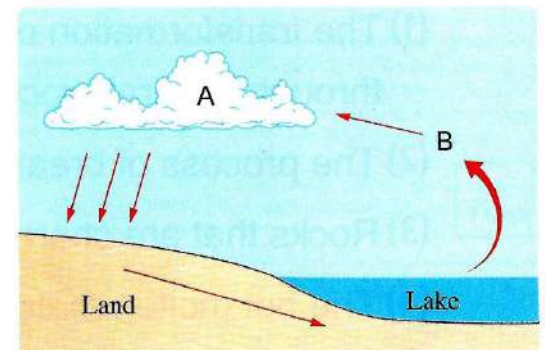
From the induced mutations is

- (a) production of wheat plants resistant to wheat rust disease.
(b) learning languages.
(c) production of cubic-shaped watermelons.
(d) blue eyes.

The opposite figure represents the water cycle.

What is the states of water (A), (B) ?

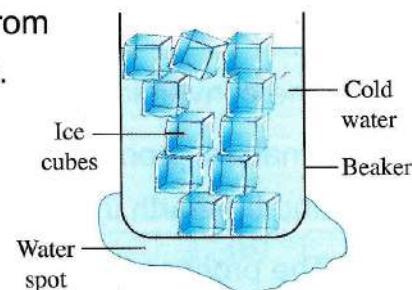
- (a) (A) : Solid , (B) : Gas.
(b) (A) : Liquid , (B) : Liquid.
(c) (A) : Liquid , (B) : Gas.
(d) (A) : Gas , (B) : Solid.



The opposite figure illustrates the formation of a spot from the water around a beaker of cold water and ice cubes.

What is the source of the water that formed the spot ?

- (a) Ice cubes.
(b) Cold water.
(c) Oxygen from the air.
(d) Water vapour from the air.



What is the process that the plants carry out in the water cycle?

- (a) Condensation. (b) Evaporation. (c) Precipitation. (d) Transpiration.

The process that precedes condensation directly in the natural water cycle is

- (a) surface runoff. (b) evaporation. (c) infiltration. (d) precipitation.

Each of the following is a factor that helps in the movement of water during the water cycle, except

- (a) gravity. (b) clouds. (c) wind. (d) sun.

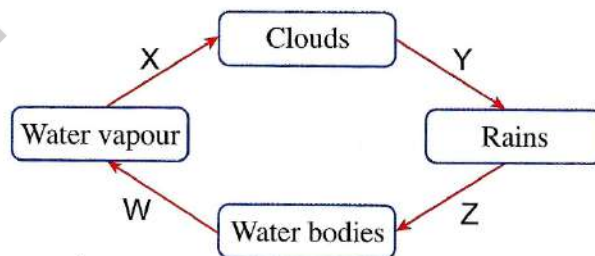
In which of the following pathways of the natural water cycle, the water is in the liquid state ?

- (a) Precipitation and transpiration. (b) Infiltration and surface runoff.
(c) Clouds and hail. (d) Hail and transpiration.

From the opposite water cycle :

1- Which of the following express the processes (W) , (X) ?

- (a) (W): Evaporation , (X): Heat gain.
(b) (W): Condensation , (X): Heat loss.
(c) (W): Condensation , (X): Heat gain.
(d) (W): Evaporation , (X): Heat loss.



2- The physical states of water change in the processes

- (a) (X) and (Y) only. (b) (W) and (X) only.
(c) (X) and (Z) only. (d) (W) , (X) and (Y) only.



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-Write the scientific term of each of the following:

1-On of the skills in scientific research and the design of scientific comparative experiments

.....

2-The variable that is changed during the experiment.

.....

3-The variable to be tested which changes in response to changing the independent variable.

.....

4-The variables that are controlled to remain constant throughout the experiments

.....

5-The energy acquired by an object as a result of its motion.

.....

6-The work done in moving an object.

.....

7-The sum of the potential and kinetic energies of any moving object.

.....

8-Energy used in operating turbines to generate electricity from the High Dam.

.....

9-A heavy tool used in demolishing old buildings as a result of the conversion of potential energy into kinetic energy.

.....

10-Any place that includes living and nonliving components and include several levels of organizations.

.....

11-The fundamental unit in the classification of any living organisms

.....

12-The various biotic population of different species that inhabit the same environment.

.....

13-A group of individuals of the same species living in a particular place at the same time.

.....

14-A nutritional relationship between two individuals where one of them benefits while the other individual is harmed or loses its life.

.....

15-A nutritional relationship between two individuals of the same species for a food source that exists in limited quantities.

16-A nutritional relationship between two individuals where both of them benefit from each other without causing harm to either of them.

17-A nutritional relationship between two individuals known as the commensal and the host.

18- A nutritional relationship between two individuals one of them benefit and the other neither benefit nor harmed.

19-Autotrophic organism that can make its own food through the photosynthesis process.

20-Animals that depend on producer to obtain their food.

21-Consumers that feed on animals and plants.

22-Consumers that feed on the remains of dead organisms.

23-The path of energy flow in the form of food as it moves from one living organism to another within the ecosystem

24-Each stage in which energy is transferred in the food chain.

25-A method in which utilization of living organisms through food systems to eliminate agricultural pests instead of using pesticides.

26-The interconnection and overlapping of multiple food chains together.

27-A pyramid represents the flow of energy and its amounts between different trophic levels in any food chain.

28-Traits that inherit from one generation to another.

29-Traits that are acquired from the surrounding environment through learning or training.

30-Behaviors and skills that are transmitted from parents to offspring without learning.

31-Vital process aims to produce new individuals.

32-Thread-like bodies that represents the genetic material of the eukaryotic organisms.

33-The central point at which the two chromatids of the chromosome are connected.

34-Segments of the nucleic acid DNA found in chromosomes responsible for the appearance of the hereditary traits in living organisms.

35-The smallest building unit of the nucleic acid.

36-The emergence of a new hereditary trait that did not previously exist as a result of a change in the nature of the gene responsible for it.

37-Mutation that occur naturally without human intervention.

38-Mutations that occur through human interventions.

39-Mutations that cause the appearance of new desirable traits whether occurring naturally or through human interventions.

40-The conversion of water from the liquid state to the gaseous state upon gaining heat.

41-The conversion of water from the gaseous state to the liquid state upon losing heat.

42-The conversion of water from solid state to liquid state upon gaining heat.

43-The conversion of water from liquid state to the solid state upon losing heat.

44-A natural process involving the movement of water between the atmospheric air and the Earth in a closed multi-path cycle.

45-The process of water loss from plants in form of water vapour.

46-The process of falling of water from clouds to the Earth's surface in form of rain, snow, or hail due to the effect of the Earth's gravity.

47-The process of rainwater flowing across the Earth's surface and into rivers, seas and lakes due to the effect of the Earth's gravity.

48-The process of removing dissolved salt from saltwater.

-Give a reason for the following:

1-The role of fuel within a car is similar to the role food within a living organisms

2-The kinetic energy of truck is greater than kinetic energy of a car when they are having the same speed.

3-The kinetic energy is maximum when pendulum moving across the original position.

4-The kinetic energy of the object increases during its falling.

5-Demolition ball is an example of energy conversions.

6-The nutritional relationship between Nile crocodile and Plover bird is not considered as a mutualism.

7-Producers are autotrophic organisms while consumers are heterotrophic.

8-Dotted beetles play an important role in protecting vegetables and fruits from agricultural pests.

9-Energy decreases while transferring from living organism to the other in energy pyramids.

10- DNA is known as double helix.

11-DNA is the source of genetic information for the living organisms.

12-Genes controls the appearance of hereditary traits.

13-A dark-skinned mother giving birth to albino child is considered as a spontaneous mutation.

14-Light skin color in individuals living in cold countries is a beneficial spontaneous mutation.

15-The production of cubic shape watermelons is an agricultural technique not a mutation.

16-Lactose tolerance is a beneficial mutation.

17-Conversion and prudent use of fresh water is essential.

18-The boiling point is a characteristic property of pure substance.

19-The formation of water droplets on the outer surface of a cup of water containing ice cubes.

20-The sun and gravity together maintain the continuity of the water cycle in nature.

21-Desalination of seawater in some remote areas.

22-The freezing of water in the cracks of rocks causes their fragmentation and breaking down.

-What happens when:

1-The mass of a moving object decreases to half while speed remains constant regarding kinetic energy.

2-Speed of moving object doubled while mass remains constant regarding kinetic energy.

3-Speed of moving object is doubled and mass decreased to half regarding kinetic energy.

4-The mass of the object decreases to quarter and speed is doubled regarding kinetic energy.

5-The pendulum drawn upward then released to move freely.



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6-The pendulum reaching maximum height regarding potential and kinetic energy.

7-The pendulum pass through original position regarding potential and kinetic energies.

8-Free falling of an object from a height regarding potential and kinetic energies.

9-Lack of food sources for individuals of the same biotic population.

10-The absence of living organism present in a balanced ecosystem.

11-Increase number of primary consumers in a food chain.

12-Decrease number of secondary consumers in a food chain.

13-Difference in arrangement of nucleotides on DNA

14-The change in nature of specific gene.

15-Placing a cup of water in a sunny place for several hours.

16-Placing a dish containing ice cubes on the opening of a cup of hot water.

17-The loss of thermal energy of the water vapour carried by air currents that are in contact with the Earth's surface.

18-The temperature of clouds dropping below the freezing point of water.

19-The accumulation of small ice crystals within clouds during thunder storms.

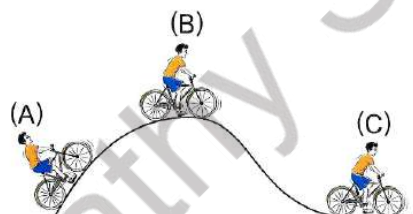
20-Placing a tightly closed bottle filled up its edge with water in the freezer of refrigerator for several hours.

-Various Questions:

The opposite figure represents the motion of a racer with a weight of 400 N, climbing the peak of a curve with a height of 5 m

Calculate his potential energy at:

- (1) Point B
- (2) Point C



A stone with a mass of 5 kg falls vertically from a height of 8 m above the ground surface Calculate its potential energy and kinetic energy at:

- (1) The beginning of falling.
- (2) When it reaches a height of 2 m above the ground surface.

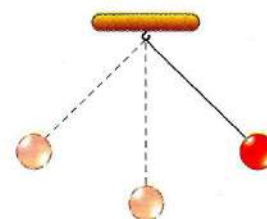
[Gravitational field intensity = 10 N/kg]

A stone with a mass of 0.5 kg was thrown upwards vertically with a speed of 5 m/s

Calculate:

- (1) The kinetic energy of the stone at the moment it was thrown upwards.
- (2) The mechanical energy of the stone at its maximum height.

The opposite figure illustrates the motion of a pendulum with a mass of 1 kg and its kinetic energy while passing through the original position is 8 J



Calculate:

- (1) Its mechanical energy at the highest point it reaches away from the original position.
- (2) Its speed at the moment it passes through the original position.

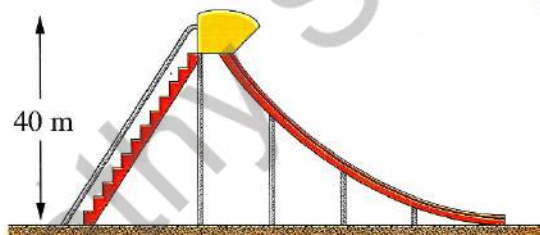
[Gravitational field intensity = 10 N/kg]

.....

.....

.....

The figure shows a staircase that one can climb and then go down a slide to return to the ground surface :



- (1) **What** is the amount of work done by a student whose mass is 40 kg to reach the top of the staircase?

- (2) **What** is the kinetic energy of the student at the moment of reaching the ground surface ?

[Gravitational field intensity = 10 N/kg]

.....

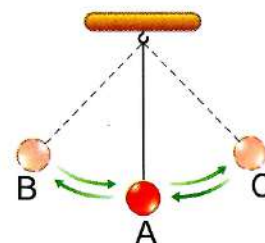
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The figure illustrates the motion of a simple pendulum:

- (1) **Identify the position(s) at which:**

- 1– The kinetic energy is at its maximum.
- 2– The potential energy equals zero.
- 3– The potential energy is at its maximum.
- 4– The speed of the pendulum ball equals zero.



- (2) What type of energy remains unchanged at each of the positions (A), (B), (C)?

.....

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The figure illustrates a ramp down which

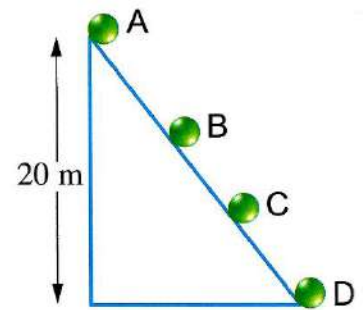
15 kg ball rolls :

(1) Compare between the potential and kinetic energies of the ball at points (A), (C) and (D).

(2) Calculate: [Gravitational field intensity = 10 N/kg]

1– The energy of the ball before falling.

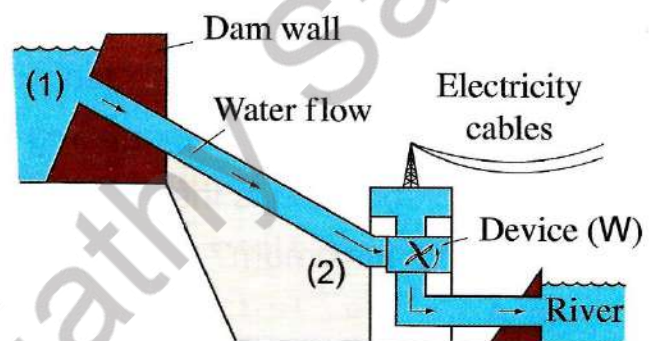
2– The square of the speed of the ball at a height of 10 m



From the figure :

(1) What is the device (W) ?

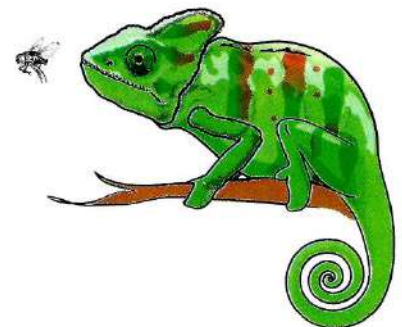
(2) What is the transformation occurring in energy when water moves from position (1) to position (2)?



The opposite figure illustrates a nutritional relationship between two living organisms :

(1) What type of nutritional relationship is illustrated in this figure ?

(2) Mention the beneficiary individual and the harmed individual in this nutritional relationship.



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The opposite figures show two living organisms that have a nutritional relationship between them :



- (1) What is the type of nutritional relationship which they have ?
- (2) What term is used to describe the crocodile in this nutritional relationship ?

.....

.....

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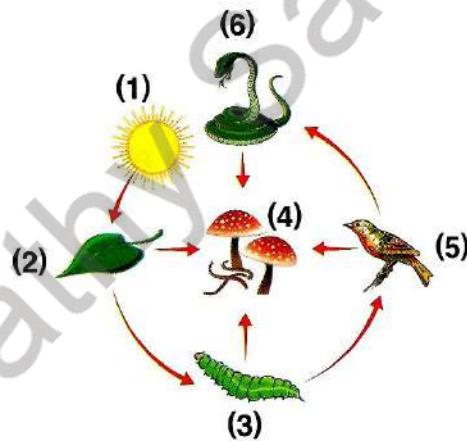
From the opposite diagram :

- (1) Does this diagram represent a food chain or a food web ?
- (2) Mention the number which indicates :

- 1- The primary consumer.
- 2- The organism that occupies the third trophic level.

(3) Complete :

- 1- The consumer number feeds on the organism number (3).
- 2- The organism number (4) is a , while the organism number is a carnivore.



.....

.....

.....

The figure shows the meerkat animal, which lives in groups :

- (1) What is the term used to refer to a group of meerkats ?
- (2) What type of nutritional relationship exists between the meerkat and the snakes on which it feeds ?
- (3) What is the impact of the disappearance of all individuals of this animal on the ecological balance in its habitat ?



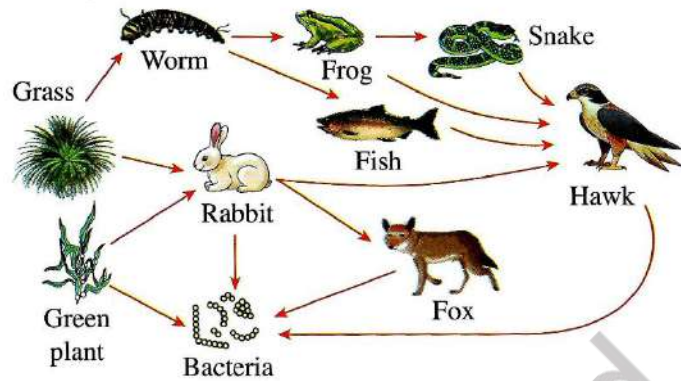
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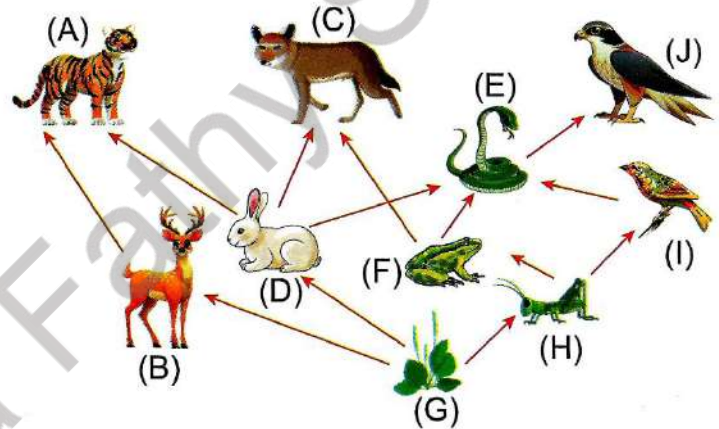
From the food web illustrated in the opposite figure :

- (1) Identify two animals that obtain their energy directly from the producers.
- (2) Why does the number of snakes decrease when the number of worms decreases ?



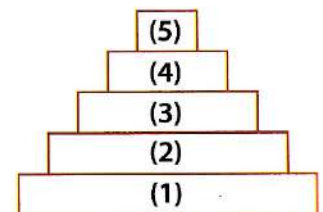
From the given food web, indicate the letter(s) representing :

- (1) The predators that occupy the top of the food chains.
- (2) Herbivores.
- (3) A consumer that is preyed by three different predators.
- (4) The producers.



The opposite diagram represents an energy pyramid :

- (1) Replace the numbers shown in it with the following living organisms : (Fruits / Snakes / Eagles / Frogs / Flies).
- (2) Which of these organisms is a secondary consumer and which one is a tertiary consumer ?



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1 From the opposite two figures :

(1) What type of mutation is shown in figure (1) ?
Give another example of this type of mutation in plants.

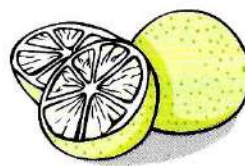


Figure (1)

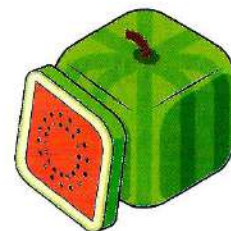


Figure (2)

(2) What is the difference between the change in each of the figures (1) and (2) ?

(3) Describe how the watermelon is produced as shown in figure (2).

From the opposite figure :

(1) Write what each of the numbers (1) : (3) indicates.

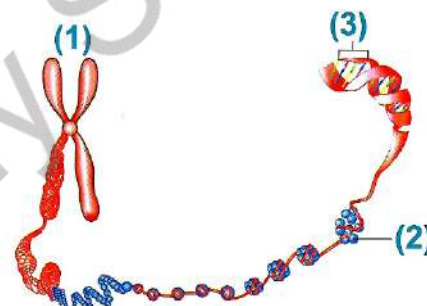
(2) State the building units of structure (3).

(3) Identify the location of structure (1)

in each of the following:

1- Eukaryotes.

2- Prokaryotes.



From the opposite figure :

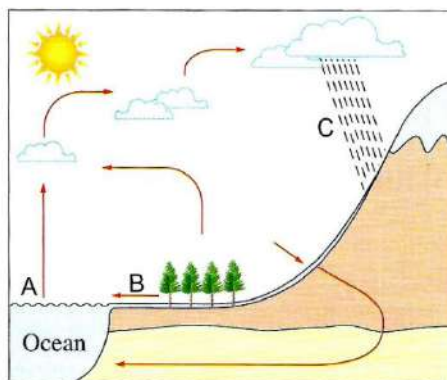
(1) What does this figure represent?

(2) What are the two processes represented by the letters (A) and (B)?

(A)

(B)

(3) What is the force causing process (C)?



(4) What is the importance of understanding natural processes?

Illustrate the physical states of water in the precipitation process.

What is the principle upon which the desalination process of seawater relies ?

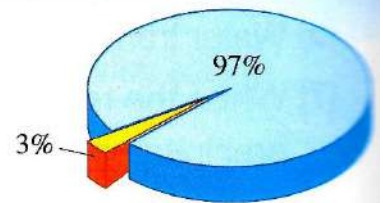
What is the role of the sun in the water cycle ?

How is hail formed ?

From the opposite figure:

What does this figure represent ?

Mention what the ratios represent.



In the opposite figure :

Mention the conversions of water in the opposite figure **and show how** they occur.

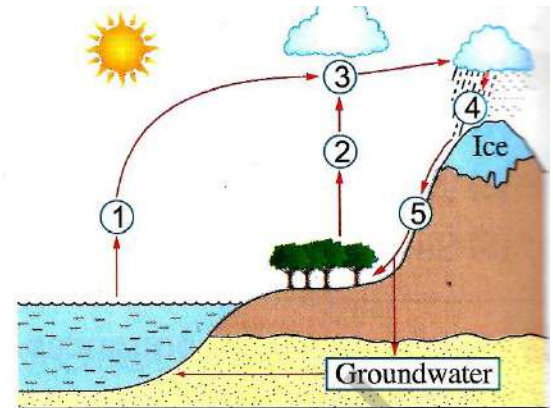


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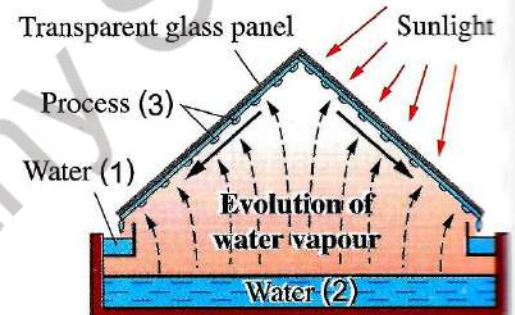
From the opposite figure :

- (1) What does this diagram express ?
- (2) Replace the numbers from (1) to (5) with the suitable processes.



The opposite figure represents one of the devices used in remote areas :

- (1) What is this device used for ?
What is its working principle ?
- (2) Replace the numbers from (1) to (3) with the suitable data.



-Classify the following into inherited traits, acquired traits and instinctive behaviors:

- 1-Eye colour.
- 2-Reading and writing.
- 3-Short legs of the arctic fox.
- 4-Facial freckles.
- 5-The squirrel breaking hazelnut shell.
- 6-The presence of a hard skeleton covering the turtle's body.
- 7-The bird building its nests.



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April Exam Revision

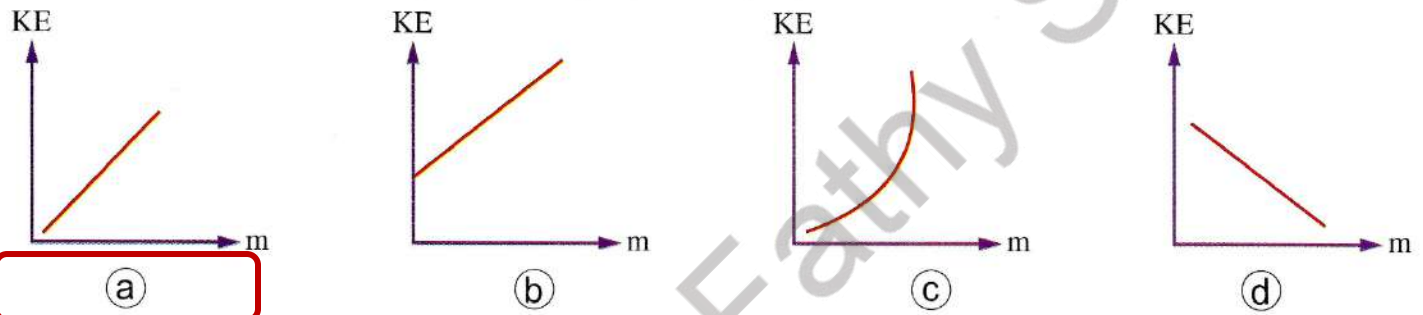


-Choose the correct answer:

What happens to the dependent variable in scientific comparative experiments?

- ☒ (a) It changes with the change of the independent variable.
- ☐ (b) It changes with the change of the controlled variable.
- ☐ (c) It does not change with the change of the independent variable.
- ☐ (d) It does not change with the change of the controlled variable.

The relation between the kinetic energy and the mass for several objects at constant speed is expressed graphically by



The kinetic energy of an object depends on

- ☒ (a) the weight of the object and its height.
- ☒ (b) the mass of the object and its speed.
- ☐ (c) the gravitational field intensity and the speed.
- ☐ (d) distance and time.

The kinetic energy of any moving object is determined by the mathematical relation

- ☐ (a) mgh
- ☐ (b) $\frac{1}{4} mv^2$
- ☐ (c) $\frac{d}{t}$
- ☒ (d) $\frac{1}{2} mv^2$

Joule is the measuring unit of kinetic energy and it is equivalent to

- ☐ (a) g/cm^3
- ☐ (b) N
- ☒ (c) $kg \times (m/s)^2$
- ☐ (d) kg/s^2



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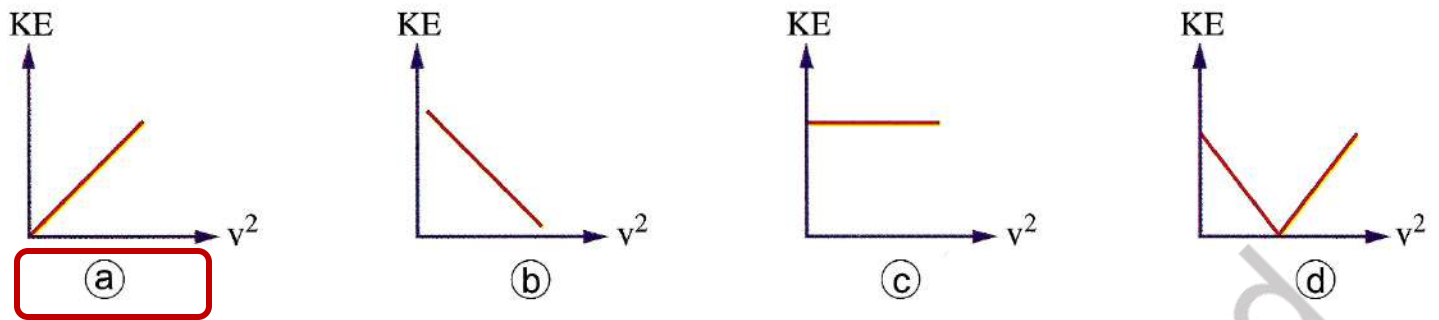
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The graph represents the relation between the kinetic energy of an object (KE) and the square of its speed (v^2) while its mass remains constant.



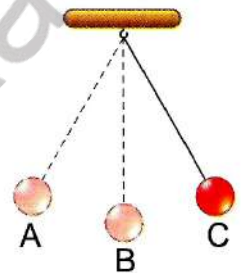
In the figure:

1- The work done on the ball at point (A) is stored in form of

- (a) potential energy.
- (b) kinetic energy.
- (c) thermal energy.
- (d) chemical energy.

2- When a pendulum ball passes through point (B), the work done at it equals

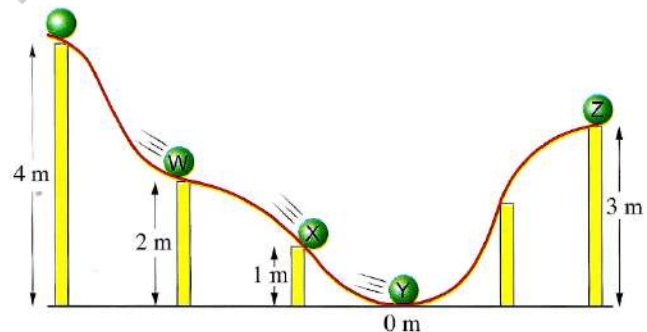
- (a) thermal energy.
- (b) chemical energy.
- (c) kinetic energy.
- (d) potential energy.



The opposite figure illustrates a ball that rolls down a slope.

Which of the following is correct ?

- (a) The potential energy of the ball at (X) is greater than at (Z).
- (b) The kinetic energy of the ball at (Y) is greater than that at (W).
- (c) The potential energy and the kinetic energy are equal at (X).
- (d) The potential energy and the kinetic energy are at their maximum at (Z).



At the maximum height reached by an object thrown upwards,

- (a) potential energy is zero.
- (b) kinetic energy is zero.
- (c) mechanical energy is zero.
- (d) the mass of the object is zero.

When an object falls vertically from a height, its mechanical energy at any point before reaching the ground is expressed as

- (a) kinetic energy only.
- (b) potential energy only.
- (c) kinetic energy - potential energy.
- (d) potential energy + kinetic energy.

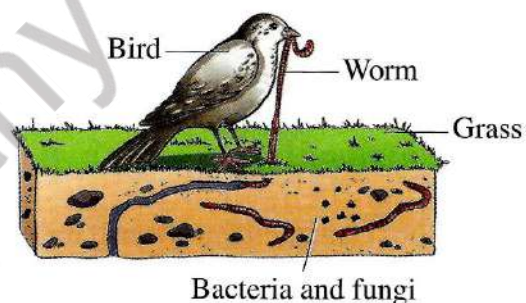
Each of the following has a value of zero, except

- (a) kinetic energy of an object at the point of its falling.
- (b) potential energy of an object at the moment it reaches the ground surface.
- (c) speed of an object at its maximum height.
- (d) mechanical energy of an object at the moment it reaches the ground surface.

The opposite figure shows several different living organisms living in a certain place.

The worms in this environment represent

- (a) a biological community.
- (b) an ecosystem.
- (c) a biotic population.
- (d) a biosphere.



Each of the following food relationships represents predation, except the relationship between

- (a) lion and zebra.
- (b) Dionea plant and insect.
- (c) Nile crocodile and plover bird.
- (d) wolf and wild rabbit.

Predators of the same species which live in the same ecosystem

- (a) become decomposers.
- (b) compete for food.
- (c) make their own food.
- (d) obtain their energy from the sun.



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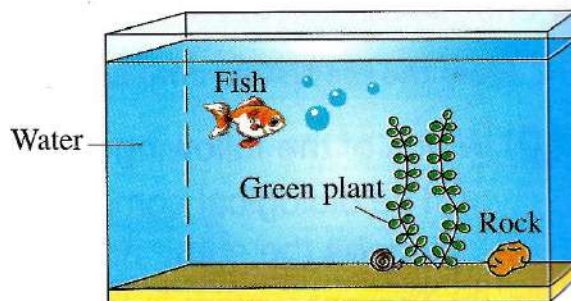
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From the opposite figure:

What is the consumer in this aquarium ?

- (a) Water.
- (b) Green plant.
- (c) Fish.
- (d) Rock.



Herbivores are

- (a) producers.
- (b) scavengers.
- (c) consumers.
- (d) decomposers.

Among the living organisms that obtain their food from plants and animals are

- (a) eagles and hyenas.
- (b) snake and cow.
- (c) rabbit and mouse.
- (d) hedgehog and bear.

The animal (X) feeds on small animals and the roots of plants, thus it is classified as a (an)

- (a) omnivore.
- (b) scavenger.
- (c) rodent.
- (d) decomposer.

Decomposers in food chains

- (a) make their food through photosynthesis.
- (b) recycle the nutrients to the ecosystem.
- (c) absorb energy from the sun.
- (d) produce new food substances.

Which of the following indicates the correct path of energy in a food chain ?

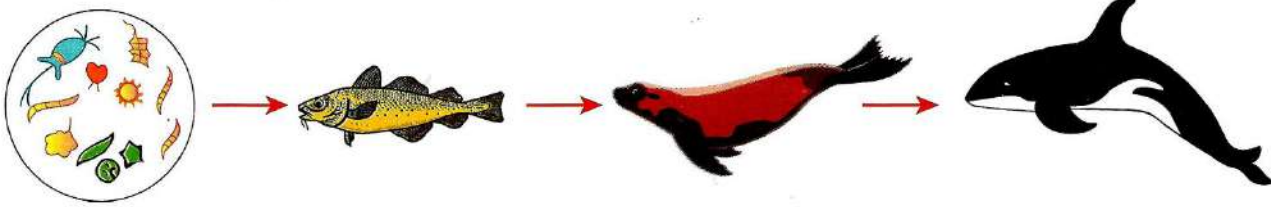
- (a) Grass → Cow → Human → Sun.
- (b) Sun → Grass → Cow → Human.
- (c) Human → Cow → Grass → Sun.
- (d) Cow → Grass → Sun → Human.



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From the following figure:



What does the arrow represent ?

- ☒ (a) The path of energy flow.
- ☐ (b) The replacement of one biological community with another.
- ☐ (c) The increase in numbers of the living organisms.
- ☐ (d) The decrease in food sources.

Which of the following obtain energy from the other three types ?

- ☐ (a) Producers.
- ☒ (b) Decomposers.
- ☐ (c) Carnivores.
- ☐ (d) Herbivores.

In the following food chain :



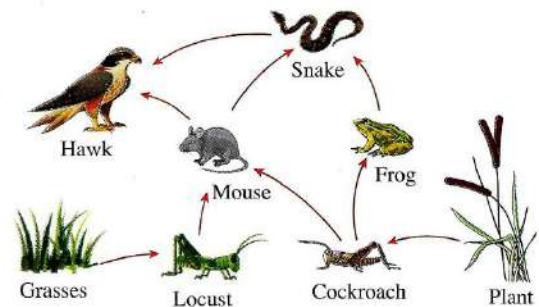
Which of the following is correct ?

- ☐ (a) Organism (2) is a carnivore.
- ☐ (b) Organism (2) is a secondary consumer.
- ☒ (c) Organism (3) is a carnivore.
- ☐ (d) Organism (3) is a tertiary consumer.

In the food web illustrated in the opposite figure :

1- Energy flows from

- ☐ (a) hawk → mouse → locust → grasses.
- ☐ (b) grasses → cockroach → hawk → frog.
- ☐ (c) locust → cockroach → frog → snake.
- ☒ (d) plant → cockroach → mouse → hawk.



2- Which of these living organisms is considered both prey and predator at the same time ?

- ☐ (a) cockroach.
- ☐ (b) Locust.
- ☒ (c) Frog.
- ☐ (d) Hawk.



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In the opposite food chain :



1– The absence of owls leads to

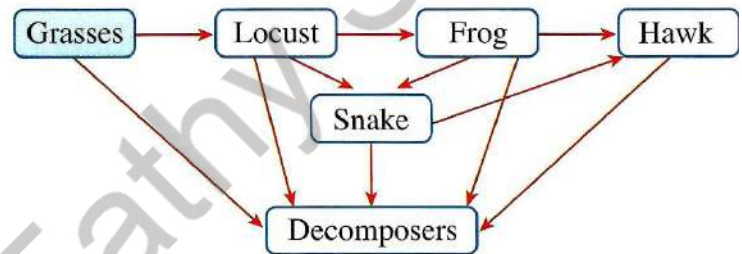
- (a) the preservation of ecological balance.
- (b) an increase in the numbers of snakes.
- (c) an increase in the numbers of mice.
- (d) a decrease in the numbers of young chickens.

2– How many consumers are found in this food chain ?

- (a) 2
- (b) 3
- (c) 4
- (d) 5

In the opposite food web :

Which of the following organisms obtain energy from the same food source ?

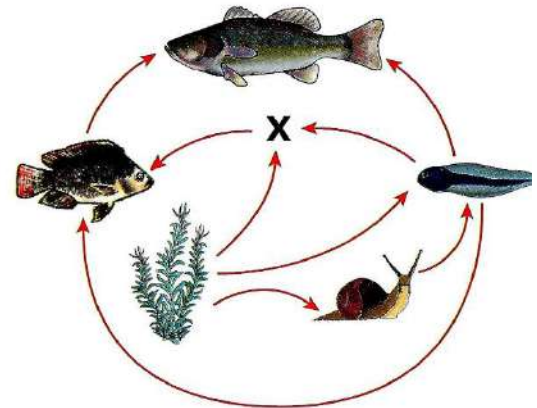


- (a) Locust and snake.
- (b) Hawk and frog.
- (c) Frog and snake.
- (d) Decomposers and grasses.

In the food web illustrated in the opposite figure :

(X) represents

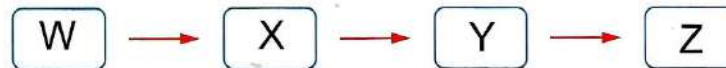
- (a) a herbivore.
- (b) a carnivore.
- (c) an omnivore.
- (d) a producer.



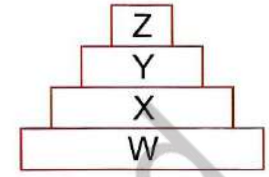
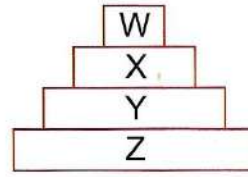
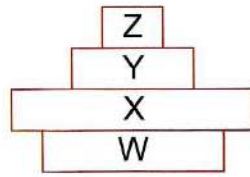
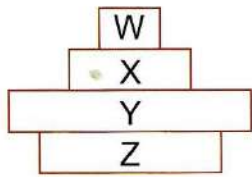
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The following diagram illustrates a food chain :

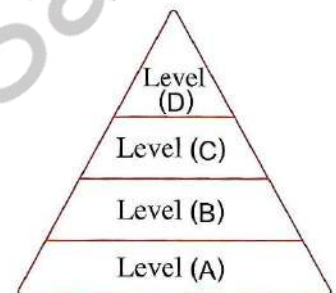


Which of the following shows the energy pyramid that represents this chain ?



The opposite diagram represents an energy pyramid in which the organisms of level (A) obtain their energy from

- (a) the producers.
- (b) organisms of level (B).
- (c) the sun.
- (d) organisms of level (D).



The amount of energy lost when moving from any trophic level to the next level in the energy pyramid equals

- (a) 1%
- (b) 10%
- (c) 90%
- (d) 100%

In a food chain, if the energy of the producer is 1000 energy units, then the energy of the secondary consumer equals energy units.

- (a) 1000
- (b) 100
- (c) 10
- (d) 0.1

Millions of nucleotides come together directly, forming

- (a) chromosomes.
- (b) chromatids.
- (c) genes.
- (d) histones.

What is the composition of the mixture which is used to separate strawberry chromosomes?

- (a) Salt, dishwashing liquid and water only.
- (b) Salt, ethyl alcohol and water only.
- (c) Dishwashing liquid and ethyl alcohol only.
- (d) Salt, dishwashing liquid and ethyl alcohol.

The number of chromosomes in corn plant cells equals chromosomes.

(a) 20

(b) 26

(c) 32

(d) 46

The central point at which the two chromatids of the chromosome are connected is called

(a) the nucleotide. (b) the centrosome. (c) the gene.

(d) the centromere.

Histones are

(a) enzymes.

(b) proteins.

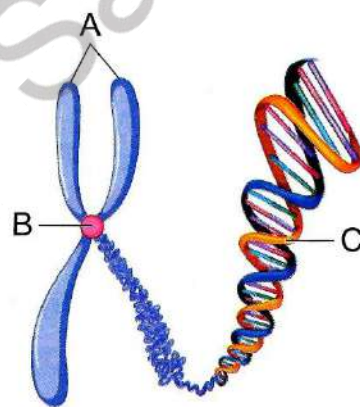
(c) fats.

(d) carbohydrates.

From the opposite figure :

Which of the following represents each of (A), (B) and (C) ?

Choices	(A)	(B)	(C)
(a)	Chromosome	Nucleotide	DNA
(b)	DNA	Centromere	Nucleotide
(c)	DNA	Nucleotide	Gene
(d)	Chromatids	Centromere	DNA



From the opposite figure :

1- The part referred to by the letter (X) is a

(a) chromatid.

(b) chromosome.

(c) histone.

(d) nucleotide.

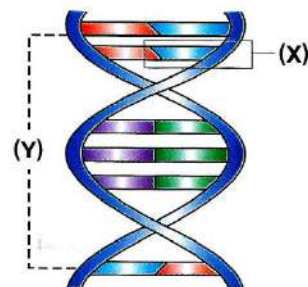
2- Which of the following statements is correct about the part referred to by the letter (Y) ?

(a) The smallest building unit of the nucleic acid DNA

(b) Responsible for the appearance of a hereditary trait of the living organism.

(c) A type of protein.

(d) Absent in prokaryotes.



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The two scientists who affirmed the hypothesis of one gene - one enzyme through their experiments are

- (a) Beadle and Crick.
- (b) Mendel and Tatum.
- (c) Beadle and Tatum.
- (d) Watson and Crick.

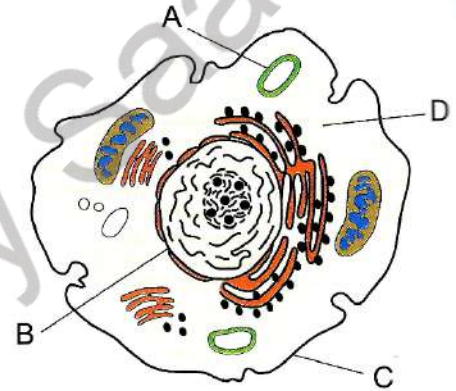
Genes control the appearance of hereditary traits in the living organism by producing

- (a) hormones.
- (b) enzymes.
- (c) chromosomes.
- (d) vitamins.

From the opposite figure of the cell :

The genetic material that the cell uses it in the production of various proteins is found in

- (a) (A).
- (b) (B).
- (c) (C).
- (d) (D).



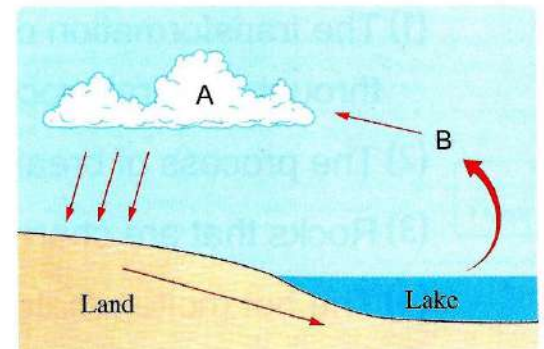
From the induced mutations is

- (a) production of wheat plants resistant to wheat rust disease.
- (b) learning languages.
- (c) production of cubic-shaped watermelons.
- (d) blue eyes.

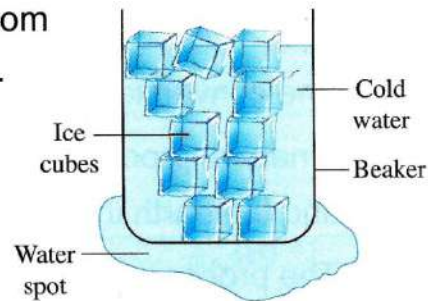
The opposite figure represents the water cycle.

What is the states of water (A), (B) ?

- (a) (A) : Solid , (B) : Gas.
- (b) (A) : Liquid , (B) : Liquid.
- (c) (A) : Liquid , (B) : Gas.
- (d) (A) : Gas , (B) : Solid.



The opposite figure illustrates the formation of a spot from the water around a beaker of cold water and ice cubes. What is the source of the water that formed the spot ?



- (a) Ice cubes.
- (b) Cold water.
- (c) Oxygen from the air.
- (d) Water vapour from the air.

What is the process that the plants carry out in the water cycle?

- (a) Condensation.
- (b) Evaporation.
- (c) Precipitation.
- (d) Transpiration.

The process that precedes condensation directly in the natural water cycle is

- (a) surface runoff.
- (b) evaporation.
- (c) infiltration.
- (d) precipitation.

Each of the following is a factor that helps in the movement of water during the water cycle, except

- (a) gravity.
- (b) clouds.
- (c) wind.
- (d) sun.

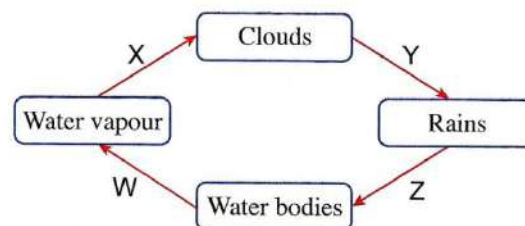
In which of the following pathways of the natural water cycle, the water is in the liquid state ?

- (a) Precipitation and transpiration.
- (b) Infiltration and surface runoff.
- (c) Clouds and hail.
- (d) Hail and transpiration.

From the opposite water cycle :

1- Which of the following express the processes (W) , (X) ?

- (a) (W): Evaporation , (X): Heat gain.
- (b) (W): Condensation , (X): Heat loss.
- (c) (W): Condensation , (X): Heat gain.
- (d) (W): Evaporation , (X): Heat loss.



2- The physical states of water change in the processes

- (a) (X) and (Y) only.
- (b) (W) and (X) only.
- (c) (X) and (Z) only.
- (d) (W) , (X) and (Y) only.

-Write the scientific term of each of the following:

- 1-One of the skills in scientific research and the design of scientific comparative experiments **Controlling the variables**
- 2-The variable that is changed during the experiment. **Independent variable**
- 3-The variable to be tested which changes in response to changing the independent variable. **Dependent variable**
- 4-The variables that are controlled to remain constant throughout the experiments. **Controlled variable**
- 5-The energy acquired by an object as a result of its motion. **Kinetic energy**
- 6-The work done in moving an object. **Kinetic energy**
- 7-The sum of the potential and kinetic energies of any moving object. **Mechanical energy**
- 8-Energy used in operating turbines to generate electricity from the High Dam. **Kinetic energy**
- 9-A heavy tool used in demolishing old buildings as a result of the conversion of potential energy into kinetic energy. **Demolition ball**
- 10-Any place that includes living and nonliving components and include several levels of organizations. **Ecosystem**
- 11-The fundamental unit in the classification of any living organisms. **Species**
- 12-The various biotic population of different species that inhabit the same environment. **Biotic community**
- 13-A group of individuals of the same species living in a particular place at the same time. **Biotic population**
- 14-A nutritional relationship between two individuals where one of them benefits while the other individual is harmed or loses its life. **Predation**
- 15-A nutritional relationship between two individuals of the same species for a food source that exists in limited quantities. **Competition**
- 16-A nutritional relationship between two individuals where both of them benefit from each other without causing harm to either of them. **Mutualism**
- 17-A nutritional relationship between two individuals known as the commensal and the host. **Commensalism**
- 18- A nutritional relationship between two individuals one of them benefit and the other neither benefit nor harmed. **Commensalism**
- 19-Autotrophic organism that can make its own food through the photosynthesis process. **Producers**
- 20-Animals that depend on producer to obtain their food. **Consumers**



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- 21-Consumers that feed on animals and plants. **Omnivores**
- 22-Consumers that feed on the remains of dead organisms. **Scavengers**
- 23-The path of energy flow in the form of food as it moves from one living organism to another within the ecosystem. **Food chain**
- 24-Each stage in which energy is transferred in the food chain. **Trophic level**
- 25-A method in which utilization of living organisms through food systems to eliminate agricultural pests instead of using pesticides. **Biological control**
- 26-The interconnection and overlapping of multiple food chains together. **Food web**
- 27-A pyramid represents the flow of energy and its amounts between different trophic levels in any food chain. **Energy pyramid**
- 28-Traits that inherit from one generation to another. **Inherited traits**
- 29-Traits that are acquired from the surrounding environment through learning or training. **Acquired traits**
- 30-Behaviors and skills that are transmitted from parents to offspring without learning. **Instinctive behaviors**
- 31-Vital process aims to produce new individuals. **Reproduction**
- 32-Thread-like bodies that represents the genetic material of the eukaryotic organisms. **Chromosomes**
- 33-The central point at which the two chromatids of the chromosome are connected. **Centromere**
- 34-Segments of the nucleic acid DNA found in chromosomes responsible for the appearance of the hereditary traits in living organisms. **Genes**
- 35-The smallest building unit of the nucleic acid. **Nucleotides**
- 36-The emergence of a new hereditary trait that did not previously exist as a result of a change in the nature of the gene responsible for it. **Mutation**
- 37-Mutation that occur naturally without human intervention. **Spontaneous mutation**
- 38-Mutations that occur through human interventions. **Induced mutation**
- 39-Mutations that cause the appearance of new desirable traits whether occurring naturally or through human interventions. **Beneficial mutations**
- 40-The conversion of water from the liquid state to the gaseous state upon gaining heat. **Evaporation**
- 41-The conversion of water from the gaseous state to the liquid state upon losing heat. **Condensation**
- 42-The conversion of water from solid state to liquid state upon gaining heat. **Melting**
- 43-The conversion of water from liquid state to the solid state upon losing heat. **Freezing**

- 44-A natural process involving the movement of water between the atmospheric air and the Earth in a closed multi-path cycle. **Water cycle**
- 45-The process of water loss from plants in form of water vapour. **Transpiration**
- 46-The process of falling of water from clouds to the Earth's surface in form of rain, snow, or hail due to the effect of the Earth's gravity. **Precipitation**
- 47-The process of rainwater flowing across the Earth's surface and into rivers, seas and lakes due to the effect of the Earth's gravity. **Surface Run off**
- 48-The process of removing dissolved salt from saltwater. **Desalination of sea water**

-Give a reason for the following:

1-The role of fuel within a car is similar to the role food within a living organisms

Because the chemical energy found in food and fuel is potential energy stored in chemical bonds, it is released and converted into kinetic energy when a chemical reaction occurs.

2-The kinetic energy of truck is greater than kinetic energy of a car when they are having the same speed.

Because the mass of the truck is greater than the mass of a car and as the kinetic energy increases its mass increases

3-The kinetic energy is maximum when pendulum moving across the original position.

Because its speed at this point is maximum.

4-The kinetic energy of the object increases during its falling.

Due to the increase in its speed during its falling, and as the kinetic energy of the object increases its speed increase.

5-Demolition ball is an example of energy conversions.

Because the potential energy stored in the heavy ball which is suspended at a height is converted into kinetic energy when it is released which is used in demolition.

6-The nutritional relationship between Nile crocodile and Plover bird is not considered as a mutualism.

Because in this nutritional relationship only one of the individual's benefits (plover bird) by feeding on the leftover food that get trapped between the crocodile's teeth while the crocodile neither benefits nor is harmed.



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7-Producers are autotrophic organisms while consumers are heterotrophic.

Because producers can make their own food through the photosynthesis process while consumers depend directly or indirectly on producers to obtain their food.

8-Dotted beetles play an important role in protecting vegetables and fruits from agricultural pests.

Due to their feeding on aphids insect, which are considered one of the agricultural pests instead of using pesticides.

9-Energy decreases while transferring from living organism to the other in energy pyramids.

because only 1/10 of energy is transferred from the living organisms at any trophic level to the living organisms which occupy the next trophic level in the energy pyramid.

10- DNA is known as double helix.

Because it exists in the form of two strands twisted around each other forming a double helix.

11-DNA is the source of genetic information for the living organisms.

Because it composed of small segments called genes which are responsible for the appearance of the hereditary traits in the living organism.

12-Genes controls the appearance of hereditary traits.

Because each gene produces a specific enzyme which is responsible for the occurrence of a chemical reaction that leads the formation of a protein that expresses a specific hereditary trait.

13-A dark-skinned mother giving birth to albino child is considered as a spontaneous mutation.

Because it occurs naturally without human intervention.

14-Light skin color in individuals living in cold countries is a beneficial spontaneous mutation.

It is a spontaneous mutation because it occurs naturally without human intervention and it is a beneficial mutation because it helps these individuals to absorb vitamin D better.

15-The production of cubic shape watermelons is an agricultural technique not a mutation.

Because it results from placing the watermelon in square moulds during its growth causing it to take the shape of the mould without any change in its genetic nature.



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16-Lactose tolerance is a beneficial mutation.

Because it converts lactose sugar found in milk and dairy products, such as cheese and yogurt into simpler sugars that are easier for the body to absorb.

17-Conservation and prudent use of fresh water is essential.

To ensure its sustainability in the future as fresh water represents approximately 3% only of the water available on the Earth's surface.

18-The boiling point is a characteristic property of pure substance.

Because each substance has its own boiling point that occurs at a certain temperature.

19-The formation of water droplets on the outer surface of a cup of water containing ice cubes.

Due to the condensation of water vapour present in air forming the water droplets on the outer surface of the cold cup.

20-The sun and gravity together maintain the continuity of the water cycle in nature.

Because the heat of the sun causes water to move from the Earth to the atmospheric air through the process of evaporation while the gravity of the Earth causes the water to return back to the Earth again through the process of precipitation.

21-Desalination of seawater in some remote areas.

To face the shortage of fresh water resources suitable for drinking and irrigation.

22-The freezing of water in the cracks of rocks causes their fragmentation and breaking down.

Because the volume of water increase upon freezing.

-What happens when:

1-The mass of a moving object decreases to half while speed remains constant regarding kinetic energy.

The kinetic energy of the object decreases to half.

2-Speed of moving object doubled while mass remains constant regarding kinetic energy.

The kinetic energy of the object increases to four times its value.

3-Speed of moving object is doubled and mass decreased to half regarding kinetic energy.

The kinetic energy of the object increases to double.

4-The mass of the object decreases to quarter and speed is doubled regarding kinetic energy.

The kinetic energy of the object remains constant.

5-The pendulum drawn upward then released to move freely.

The pendulum ball moves left and right around the original position such that its speed decreases as it moves away from the original position, and its speed is at its maximum while passing through the original position.

6-The pendulum reaching maximum height regarding potential and kinetic energy.

Its kinetic energy becomes zero and its potential energy is at its maximum.

7-The pendulum pass through original position regarding potential and kinetic energies.

Its kinetic energy is at its maximum and its potential energy becomes zero.

8-Free falling of an object from a height regarding potential and kinetic energies.

The potential energy decreases gradually and the kinetic energy increases by the same amount.

9-Lack of food sources for individuals of the same biotic population.

Competition among them increase, which affects their numbers.

10-The absence of living organism present in a balanced ecosystem.

This affects the remaining individuals of the food chain or the food web, leading to a disruption of ecological balance or even its destruction.

11-Increase number of primary consumers in a food chain.

This leads to a decrease in the numbers of the producers and an increase in the numbers of the secondary consumers.

12-Decrease number of secondary consumers in a food chain.

This results in an increase in the numbers of the primary consumers and a decrease in the numbers of the tertiary consumers.

13-Difference in arrangement of nucleotides on DNA

The genes present on a single chromosome differ, leading to the difference in the hereditary trait that each gene is responsible for expression.

14-The change in nature of specific gene.

This leads to a change in the hereditary trait that this gene is responsible for, and hence the appearance of a new trait that did not previously exist, these changes are known as mutation.

15-Placing a cup of water in a sunny place for several hours.

The amount of water in the cup decreases gradually as it converts into water vapour due to the energy gained from the heat of the sun.

16-Placing a dish containing ice cubes on the opening of a cup of hot water.
Water vapour evolves from the cup condenses on the lower surface of the dish falling back into the cup where it evaporates again in a closed cycle.

17-The loss of thermal energy of the water vapour carried by air currents that are in contact with the Earth's surface.

It condenses and tiny droplets of water accumulate to form clouds.

18-The temperature of clouds dropping below the freezing point of water.

Snow precipitates instead of rain.

19-The accumulation of small ice crystals within clouds during thunder storms.

Precipitation occurs in the form of hail.

20-Placing a tightly closed bottle filled up its edge with water in the freezer of refrigerator for several hours.

It will break due to the increase of the water volume when it freezes.

-Various Questions:

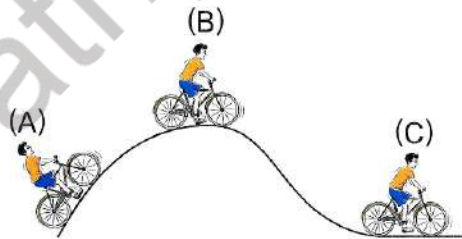
The opposite figure represents the motion of a racer with a weight of 400 N, climbing the peak of a curve with a height of 5 m

Calculate his potential energy at:

- (1) Point B
- (2) Point C

1-P.E. = $W \times h = 400 \times 5 = 2000 \text{ J}$

2-P.E. = $W \times h = 400 \times \text{zero} = \text{zero}$



.....
A stone with a mass of 5 kg falls vertically from a height of 8 m above the ground surface **Calculate its potential energy and kinetic energy at:**

- (1) The beginning of falling.
- (2) When it reaches a height of 2 m above the ground surface.

[Gravitational field intensity = 10 N/kg]

1-At the beginning of falling:

Kinetic energy = zero

Potential energy = $W \times h = m \times g \times h = 5 \times 10 \times 8 = 400 \text{ J}$

mechanical energy = potential energy at maximum point = 400 J

2-When it reaches height of 2 m above ground:

Potential energy = $W \times h = m \times g \times h = 5 \times 10 \times 2 = 100 \text{ J}$

K.E. = M.E. - P.E = 400 - 100 = 300 J

.....
A stone with a mass of 0.5 kg was thrown upwards vertically with a speed of 5 m/s

Calculate:

- (1) The kinetic energy of the stone at the moment it was thrown upwards.
- (2) The mechanical energy of the stone at its maximum height.

1-

K.E. at the moment it was thrown = $\frac{1}{2} m v^2 = 0.5 \times 0.5 \times 25 = 6.25 \text{ J}$

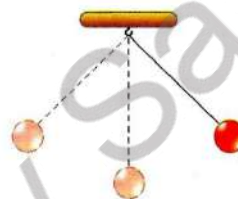
K.E. = M.E. at the moment stone was thrown upwards = 6.25 J

2-

M.E. is constant at any point = 6.25 J

The opposite figure illustrates

the motion of a pendulum with a mass of 1 kg and its kinetic energy while passing through the original position is 8 J



Calculate:

- (1) Its mechanical energy at the highest point it reaches away from the original position.
- (2) Its speed at the moment it passes through the original position.

[Gravitational field intensity = 10 N/kg]

1-

M.E. = K.E. at original position = 8 J

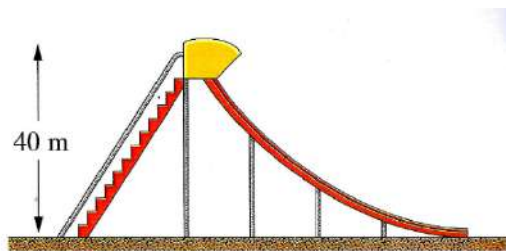
M.E. is constant at all points during motion , so M.E. at maximum height = 8 J

2-

**K.E. = $\frac{1}{2} m V^2$ ----- $V^2 = 2K.E. / m = (2 \times 8) / 1 = 16$
 $V = 4 \text{ m/s}$**

.....
The figure shows a staircase that one can climb and then go down a slide to return to the ground surface :

- (1) **What** is the amount of work done by a student whose mass is 40 kg to reach the top of the staircase?



- (2) **What** is the kinetic energy of the student at the moment of reaching the ground surface ?

[Gravitational field intensity = 10 N/kg]

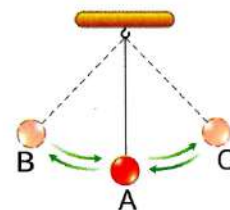
1-Work done = P.E. = $W \times h = m \times g \times h = 40 \times 10 \times 40 = 16000 \text{ J}$

2-K.E. at the ground surface = P.E. at the maximum height = 16000 J

The figure illustrates the motion of a simple pendulum:

(1) Identify the position(s) at which:

- 1- The kinetic energy is at its maximum.
- 2- The potential energy equals zero.
- 3- The potential energy is at its maximum.
- 4- The speed of the pendulum ball equals zero.



(2) What type of energy remains unchanged at each of the positions (A), (B), (C)?

1) 1- A 2- A 3- B, C 4- B, C

2) Mechanical Energy

The figure illustrates a ramp down which

15 kg ball rolls :

(1) Compare between the potential and kinetic energies of the ball at points (A), (C) and (D).

(2) Calculate: [Gravitational field intensity = 10 N/kg]

- 1- The energy of the ball before falling.
- 2- The square of the speed of the ball at a height of 10 m

1) A: K.E. = zero P.E. is maximum

C: K.E. is greater than P.E.

D: K.E. maximum P.E. is zero.

2)

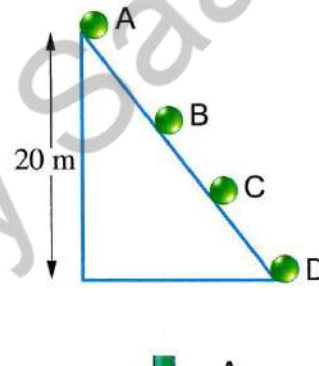
1-Before falling, all the energy is stored in the ball as P.E.

$$P.E. = W \times h = m \times g \times h = 15 \times 10 \times 20 = 3000 \text{ J}$$

2-At height 10 i.e. middle of the height:

$$M.E. = P.E. = 2 \text{ K.E.} \quad \text{so K.E.} = 1500 \text{ J}$$

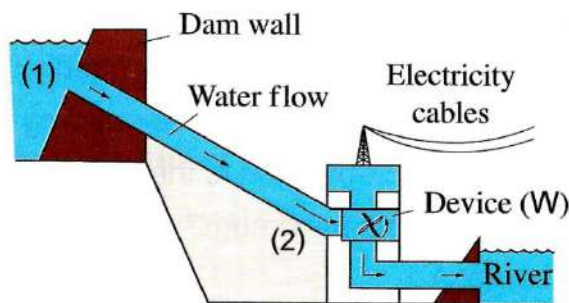
$$K.E. = \frac{1}{2} m V^2 \quad \text{-----} \quad V^2 = 2K.E. / m = 3000/15 = 200 \text{ (m/s)}^2$$



From the figure :

(1) What is the device (W) ?

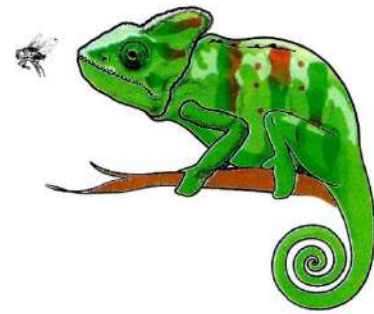
(2) What is the transformation occurring in energy when water moves from position (1) to position (2)?



1- W is a water turbine.

2-The potential energy is converted into kinetic energy

The opposite figure illustrates a nutritional relationship between two living organisms :



- (1) What type of nutritional relationship is illustrated in this figure ?
- (2) Mention the beneficiary individual and the harmed individual in this nutritional relationship.

1-Predation.

2-Beneficiary individual is panther chameleon (predator) and harmed individual is the insect (prey)

The opposite figures show two living organisms that have a nutritional relationship between them :



- (1) What is the type of nutritional relationship which they have ?
- (2) What term is used to describe the crocodile in this nutritional relationship ?

1-Commensalism

2-host

From the opposite diagram :

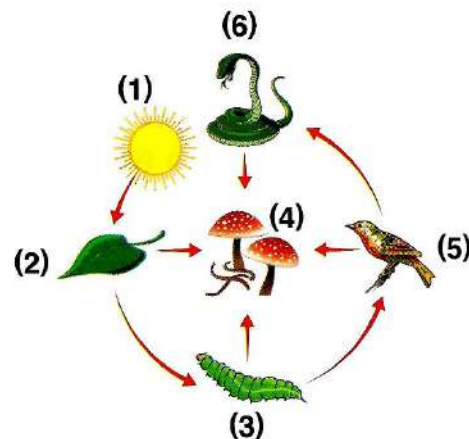
- (1) Does this diagram represent a food chain or a food web ?

(2) Mention the number which indicates :

- 1- The primary consumer.
- 2- The organism that occupies the third trophic level.

(3) Complete :

- 1- The consumer number feeds on the organism number (3).
- 2- The organism number (4) is a , while the organism number is a carnivore.



1) Food chain.

2) 1- number 3

2-number 5

3) 1-5

2-decomposer – 6

The figure shows the meerkat animal, which lives in groups :

- (1) What is the term used to refer to a group of meerkats ?
- (2) What type of nutritional relationship exists between the meerkat and the snakes on which it feeds ?
- (3) What is the impact of the disappearance of all individuals of this animal on the ecological balance in its habitat ?



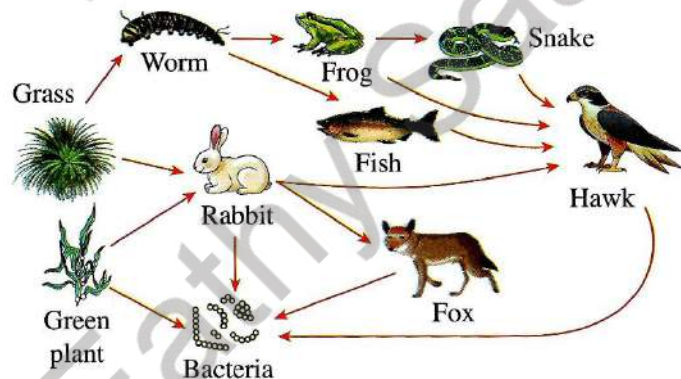
1) Biotic population.

2) Predation

3) Disruption of the ecological balance and habitat destruction.

From the food web illustrated in the opposite figure :

- (1) Identify two animals that obtain their energy directly from the producers.
- (2) Why does the number of snakes decrease when the number of worms decreases ?

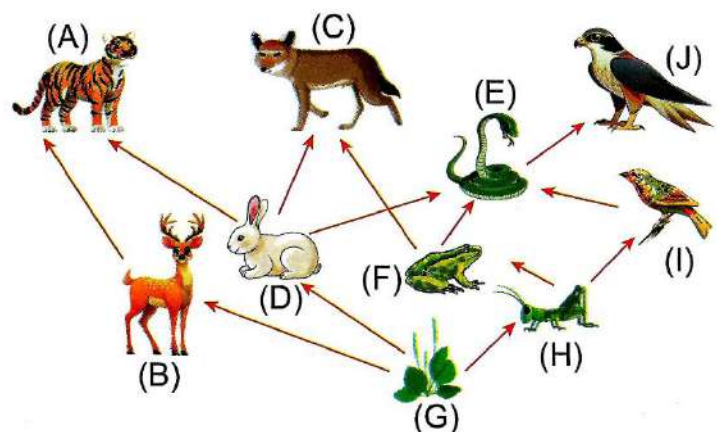


1) Worm and rabbit

2) Because when number of worms decrease it leads to a decrease in the number of frogs which represents the prey of snakes.

From the given food web, indicate the letter(s) representing :

- (1) The predators that occupy the top of the food chains.
- (2) Herbivores.
- (3) A consumer that is preyed by three different predators.
- (4) The producers.



1) A, C and J

2) B, D and H

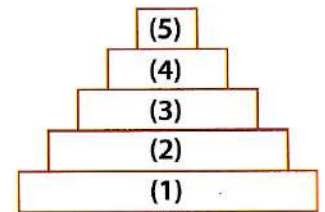
3) D

4) G

The opposite diagram represents an energy pyramid :

(1) Replace the numbers shown in it with the following living organisms : (Fruits / Snakes / Eagles / Frogs / Flies).

(2) Which of these organisms is a secondary consumer and which one is a tertiary consumer ?



1- (1) Fruits (2) Flies (3) Frogs (4) Snakes (5) Eagles

2-Frogs is a secondary consumer, while snakes is tertiary consumer.

1 From the opposite two figures :

(1) What type of mutation is shown in figure (1) ?
Give another example of this type of mutation in plants.

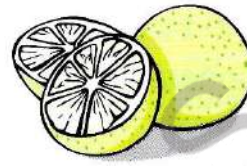


Figure (1)

(2) What is the difference between the change in each of the figures (1) and (2) ?

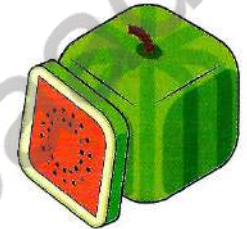


Figure (2)

(3) Describe how the watermelon is produced as shown in figure (2).

1-Beneficiary induced mutation e.g. Wheat plant resistant to rust disease.

2-Figure 1 is a mutation, while figure 2 is an agricultural technique.

3-By placing it in a square mold during its growth.

From the opposite figure :

(1) Write what each of the numbers (1) : (3) indicates.

(2) State the building units of structure (3).

(3) Identify the location of structure (1)

in each of the following:

1- Eukaryotes.

2- Prokaryotes.

1) 1: Chromosome

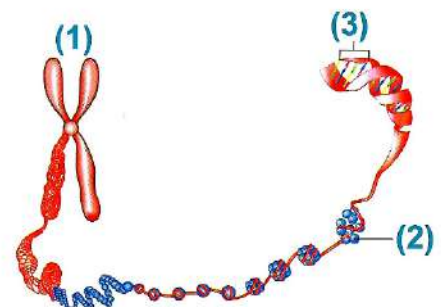
2-Histone

3- Gene

2) Nucleotides

3) 1- Nuclei of cell

2- cytoplasm



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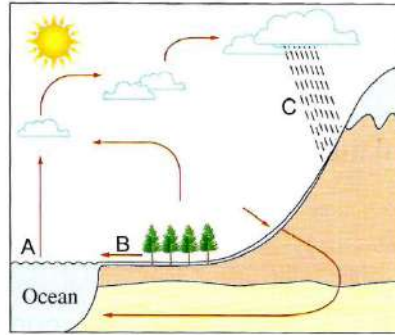
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From the opposite figure :

(1) What does this figure represent?



(2) What are the two processes represented by the letters (A) and (B)?

(A)

(B)

(3) What is the force causing process (C)?

.....

(4) What is the importance of understanding natural processes?

.....

1-The water cycle in nature.

2-A. Evaporation

B. Surface run off

3-Gravitational force.

4-It helps to predict changes in natural processes in the future.

.....
Illustrate the physical states of water in the precipitation process.

The liquid state of precipitation is rain while solid state of precipitation is snow or hail.

.....
What is the principle upon which the desalination process of seawater relies ?

It depends on evaporation and condensation processes.

.....
What is the role of the sun in the water cycle ?

It moves water from Earth to atmospheric air during evaporation process and maintain the ecosystem balance

.....
How is hail formed ?

When small snow crystals accumulate during thunder storms.

.....



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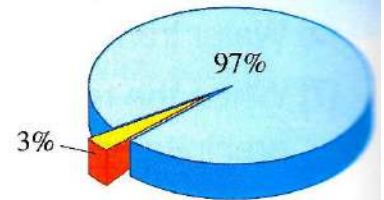
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From the opposite figure:

What does this figure represent ?

Mention what the ratios represent.



The figure represents the percentage of salt water of 97% and the percentage of fresh water of 3% in relation to the total area of water bodies on Earth's surface.

In the opposite figure :

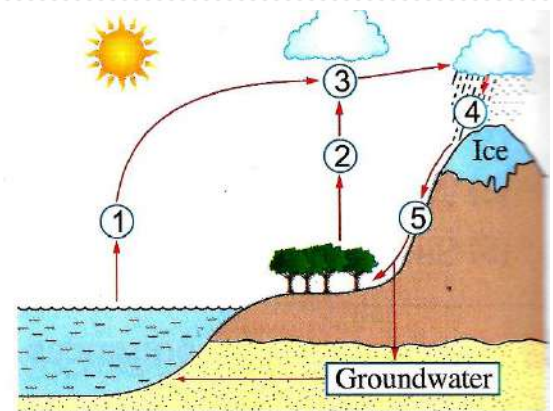
Mention the conversions of water in the opposite figure and show how they occur.



-Water is converted from liquid state to gaseous state by gaining heat, then water vapor convert from gaseous state to liquid state by losing heat upon contact with cold surface of pot lid.

From the opposite figure :

- (1) What does this diagram express ?
- (2) Replace the numbers from (1) to (5) with the suitable processes.



1-Water cycle in nature.

2-

- | | | |
|-------------------|--------------------|------------------|
| (1) evaporation | (2) Transpiration | (3) Condensation |
| (4) Precipitation | (5) Surface runoff | |



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The opposite figure represents one of the devices used in remote areas :

(1) What is this device used for ?

What is its working principle ?

(2) Replace the numbers from (1) to (3) with the suitable data.

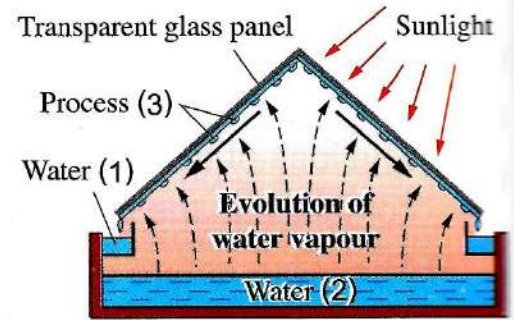
1-It is used in the desalination of sea water and it's working principle depends on the evaporation and condensation processes.

2-

(1) Fresh water

(2) Sea water

(3) Condensation process



-Classify the following into inherited traits, acquired traits and instinctive behaviors:

1-Eye colour. (inherited traits)

2-Reading and writing. (Acquired traits)

3-Short legs of the arctic fox. (Inherited traits)

4-Facial freckles. (Inherited traits)

5-The squirrel breaking hazelnut shell. (Instinctive Trait)

6-The presence of a hard skeleton covering the turtle's body. (Inherited trait)

7-The bird building its nests. (Instinctive trait)



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حمل الآن

مجاناً وحصرياً

المراجعة رقم (4)

اختبار شهر ابريل





April Revision

Mr. Ahmed Elbasha

★ **(1) Write the scientific term:**

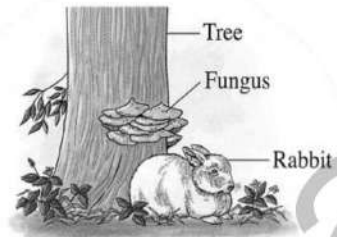
- 1) Any place that includes living organisms and non-living (abiotic) components and includes several levels of organization. (.....)
- 2) The fundamental unit in the classification of the living organisms. (.....)
- 3) The various biotic populations of different species that inhabit the same environment. (.....)
- 4) A group of individuals of the same species living in a particular place at the same time. (.....)
- 5) A nutritional relationship between two individuals where one of them benefits, while the other individual is harmed or loses its life. (.....)
- 6) A nutritional relationship between two individuals of the same species for a food source that exists in limited quantities. (.....)
- 7) A nutritional relationship between two individuals where both benefit from each other without causing harm to either of them. (.....)
- 8) A nutritional relationship between two individuals, one of them benefits and the other neither benefits nor is harmed. (.....)
- 9) Autotrophic organisms that can make their own food through the photosynthesis process. (.....)
- 10) Animals that depend on the producers to obtain their food. (.....)
- 11) Consumers that feed on plants and animals. (.....)
- 12) Consumers that feed on the remains of dead organisms. (.....)
- 13) Organisms that obtain energy from the breaking down of the organic substances found in dead bodies. (.....)
- 14) The interconnection and overlapping of multiple food chains together. (.....)

- 15) pyramid represents the flow of energy and its amounts between different trophic levels in any food chain. (.....)
-
- 16) Traits that are inherited from one generation to the next. (.....)
-
- 17) A vital process aims to produce new individuals resembling their parents. (.....)
-
- 18) Thread-like bodies representing the genetic material of the eukaryotic organism. (.....)
-
- 19) The central point at which the two chromatids of the chromosome are connected. (.....)
-
- 20) The science that studies the transmission of genetic traits from parents to offspring. (.....)
-
- 21) The emergence of a new hereditary trait didn't previously exist, as a result of a change in the nature of the gene responsible for it. (.....)
-
- 22) The conversion of water from the liquid state to the gaseous state upon gaining heat. (.....)
-
- 23) The conversion of water from the gaseous state to the liquid state upon losing heat. (.....)
-
- 24) A natural process involving the movement of water between the atmospheric air and the earth in a closed multi-path cycle. (.....)
-
- 25) The process of water loss from plants in form of water vapour. (.....)
-
- 26) The process of falling of water from clouds to the Earth's surface in form of rain snow or hail due to the effect of the Earth's gravity. (.....)
-
- 27) The process of removing dissolved salts from seawater. (.....)
-

✱(2) Choose the right answer:

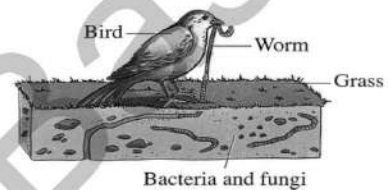
1. In the opposite figure: The tree, fungus and rabbit from

- a. omnivorous organisms.
- b. herbivorous organisms.
- c. biotic population.
- d. biological community.



2. The opposite figure shows several different living organisms living in a certain place. The worms in this environment represent

- a. a biological community.
- b. an ecosystem.
- c. a biotic population.
- d. a biosphere.



3. The main source of energy on the surface of the Earth is

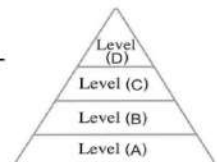
- a. the producers.
- b. the plants.
- c. the Sun.
- d. the consumers.

4. Which of the following obtain energy from the other three types ?

- a. Producers.
- b. Decomposers.
- c. Carnivores.
- d. Herbivores.

5. The opposite diagram represents an energy pyramid in which the organisms of level (A) obtain their energy from

- a. the producers.
- b. organisms of level (B).
- c. the sun.
- d. organisms of level (D).



6. The amount of energy lost when moving from any trophic level to the next level in the energy pyramid equals

- a. 1 %
- b. 10%
- c. 90%
- d. 100%

7. Which of the following is an acquired trait?

- a. Facial freckles.
- b. A dolphin playing with a ball.
- c. A squirrel breaking hazelnut shell.
- d. A chicken laying on the eggs.

8. The number of chromosomes in corn plant cells equals chromosomes.

- a. 20
- b. 26
- c. 32
- d. 46

9. The central point at which the two chromatids of the chromosome are connected is called

- a. the nucleotide.
- b. the centrosome.
- c. the gene.
- d. the centromere.

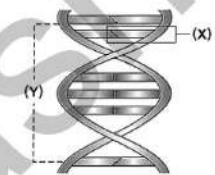
10. Histones are

- a. enzymes.
- b. proteins.
- c. fats.
- d. carbohydrates

11. From the opposite figure :

The part referred to by the letter (X) is a

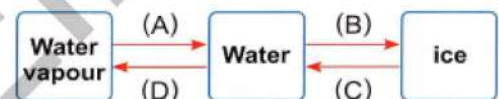
- a. chromatid.
- b. chromosome.
- c. histone.
- d. nucleotide.



12. From the opposite diagram :

What are the two processes that occur by gaining thermal energy ?

- a. (A), (B).
- b. (A), (C).
- c. (B), (D).
- d. (C), (D)



13. What are the two processes that occur at any temperature ?

- a. Melting and boiling.
- b. Evaporation and condensation.
- c. Melting and evaporation.
- d. Evaporation and boiling.

14. The percentage of water on the Earth's surface is approximately

- a. 3%
- b. 29%
- c. 70%
- d. 71%

15. What is the process that the plants carry out in the water cycle?

- a. Condensation.
- b. Evaporation.
- c. Precipitation.
- d. Transpiration.

16. The process that precedes condensation directly in the natural water cycle is

- a. surface runoff.
- b. evaporation.
- c. infiltration.
- d. precipitation.

***(3) Put (√) or (X) :**

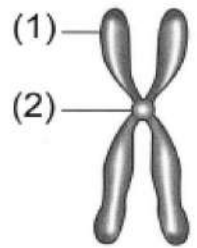
1. The nutritional relationship between lion and tiger is a predation. ()
2. The animal is the only living organism that makes its own food. ()
3. The primary consumer is always a herbivore. ()
4. The food chain consists of several overlapped food webs. ()
5. Energy flows from the consumers to the producers in the food web. ()
6. Number of rabbits in a biological community increases when predators decrease. ()
7. The presence of a hard skeleton covering the turtle's body is an acquired trait. ()
8. Individuals of the same species have different number of chromosomes present in their somatic cells. ()
9. An individual inherits half of his genetic material from the father and the other half from the mother. ()
10. A change in the nature of the gene leads to a change in the hereditary trait which responsible for it and the appearance of a new hereditary trait. ()
11. Human control the occurrence of spontaneous mutations. ()
12. Water represents about 71 % of the human body. ()
13. The rate of evaporation in tropical regions is faster than that in polar regions. ()
14. Liquid water converts into ice through condensation process. ()
15. Ice in polar regions melts when it loses thermal energy and converts into water. ()
16. Water transfers from the oceans to the air through surface runoff process. ()

***(4) Complete the following:**

1. The opposite figure shows a relationship between which is cat and which is mouse.
2. The nutritional relationship between bees and plant flowers is while the nutritional relationship between *Dionaea* plant and insect is
3. The food chain begins with such as and ends with such as bacteria.
4. Producers obtain energy from while the obtain their energy from producers.
5. traits are transmitted from parents to offspring without learning.
6. The genetic material is found in of the prokaryotes, while it is found in of the eukaryotes.

**7. From the opposite figure :**

- 1- The figure represents
- 2- The number (1) refers to, while the number (2) refers to
8. The number of chromosomes in human skin cell is chromosomes.
9. A chromosome is chemically composed of a nucleic acid called twisted around a protein known as
10. Each gene produces a specific responsible for the occurrence of a, leads to the formation of a that expresses a specific hereditary trait.
11. Water vapour condenses and turns into droplets of water upon thermal energy, while ice melts turning into liquid water upon thermal energy.
12. In the conversion processes of the matter, and processes occur at any temperature, while the process occurs at a certain temperature.
13. A portion of rainwater infiltrates into the cracks of the Earth's surface due to and is stored as
14. The process of is carried out to face the shortage of fresh water resources in remote areas.



✳(5) Give reasons for:

1. The jaw of horses is characterized by the presence of incisors, while the jaw of lion is characterized by the presence of sharp canines.
.....
2. The nucleic acid DNA is known as the double helix.
.....
3. The human hair colour is hereditary trait.
.....
4. The ability to read and write is not a genetic trait.
.....
5. The bear animal is an omnivore.
.....
6. The Sun and gravity maintain the continuity of the water cycle.
.....
7. Plant is a producer.
.....
8. Hyenas and vultures are considered scavengers.
.....
9. The ladybugs are used in biological control.
.....
10. The relationships between root nodular bacteria and bean plants is considered mutualism.
.....
11. Eye colour is a genetic trait.
.....

***(6) What are the results of each of the following:**

1. If Water surfaces on Earth are subjected to the heat of the Sun.

.....

2. If Sunlight doesn't reach the Earth's surface.

.....

3. If Decomposers disappear from ecosystem.

.....

4. The cloud temperature is below freezing point.

.....

5. When Removing the grasses from the balanced ecosystem.

.....

6. When The absence of one of the living organisms present in a balanced ecosystem.

.....

7. When An increase in the number of primary consumers.

.....

8. When A decrease in the number of secondary consumers.

.....

9. When A person suffering from lactose intolerance eats a piece of milk chocolate.

.....

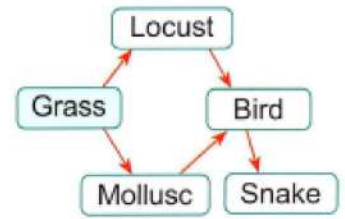
✱ **(7) Correct the underlined words :**

1	The individual harmed in the predation is called <u>the host</u> .	(.....)
2	Both individuals are harmed by the <u>commensalism</u> .	(.....)
3	Weeds and grasses make their own food through the process of <u>respiration</u> .	(.....)
4	<u>Omnivores</u> feed on the remains of dead organisms.	(.....)
5	<u>Oxygen</u> flows among living organisms in food chains.	(.....)
6	Genetic material is found in the <u>cytoplasm</u> of the eukaryotes.	(.....)
7	The scientist <u>Tatum</u> is considered the founder of genetics.	(.....)
8	The gene produces <u>a specific protein</u> that is responsible for occurrence of a specific chemical reaction.	(.....)
9	Water vapor converts into liquid water through the <u>melting</u> process.	(.....)
10	Melting process is the reverse of <u>condensation</u> process.	(.....)
11	Clouds are formed through the <u>freezing</u> of water vapor found in the air.	(.....)
12	<u>Gravity</u> acts to move water from the ground to the air.	(.....)
13	The concept of water desalination depends on the processes of <u>boiling</u> and condensation.	(.....)

*(8) Problems:

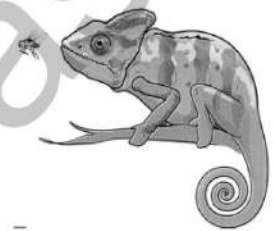
1. Study the following figures, then answer the questions:

- How many food chains do make up this web?
- Complete: To reduce the number of mollusks, it is necessary to increase the number of



2. Opposite figure illustrates a nutritional relationship between two living organisms:

- What type of nutritional relationship is illustrated in this figure ?
- Mention the beneficiary individual and the harmed



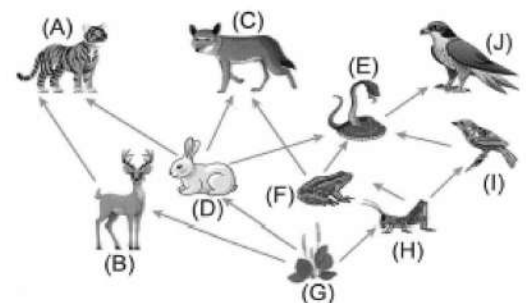
3. The opposite figure represents one of the nutritional relationships:

- What is the name of the relationship between these two organisms ?
- Which of the two organisms benefits from this nutritional relationship?.



4. From the given food web, indicate the letter(s) representing :

- The predators that occupy the top of the food chains.
- Herbivores.
- A consumer that is preyed by three different predators.
- The producers.



5. Identify type of nutritional relationship between each pair of the following organisms:

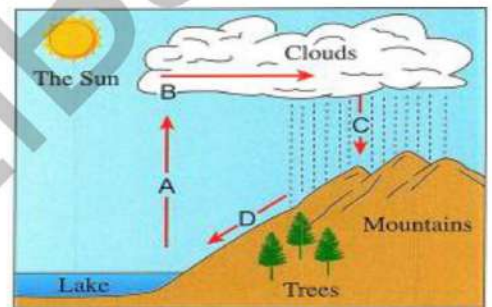
1. Lion and zebra.
2. Dionaea plant and insect.
3. Bees and flowers of plants.
4. Panther chameleon and insect.
5. Plover bird and crocodile.
6. The wolf and the rabbit.

6. Study the following figures, then answer the questions :

The opposite diagram represents the water cycle:

Replace the letters (A), (B), (C) and (D) with the appropriate terms from the following :

1. Condensation.
2. Evaporation.
3. Surface runoff.
4. Precipitation.



7. Complete the following diagram :



Model Answer

✱ (1) Write the scientific term:

- | | | | |
|-------------------------|-----------------|--------------------|-------------------|
| 1. Ecosystem | 7. Mutualism | 14. Food web | 21. Mutation |
| 2. Species | 8. Commensalism | 15. Energy pyramid | 22. Evaporation |
| 3. Biological community | 9. Producer | 16. Genetic trait | 23. Condensation |
| 4. Biotic population | 10. Consumer | 17. Reproduction | 24. Water cycle |
| 5. Predation | 11. Omnivore | 18. Chromosome | 25. Transpiration |
| 6. Competition | 12. Scavenger | 19. Centromere | 26. Precipitation |
| | 13. Decomposer | 20. Genetics | 27. Desalination |

✱ (2) Choose the right answer:

- | | | | |
|------|------|-------|-------|
| 1. D | 5. C | 9. D | 13. B |
| 2. C | 6. C | 10. B | 14. D |
| 3. C | 7. B | 11. D | 15. D |
| 4. B | 8. A | 12. D | 16. B |

✱ (3) Put (√) or (X) :

- | | | | |
|----------|----------|-----------|-----------|
| 1. (√) | 5. (X) | 9. (√) | 13. (√) |
| 2. (X) | 6. (√) | 10. (√) | 14. (X) |
| 3. (√) | 7. (X) | 11. (X) | 15. (X) |
| 4. (X) | 8. (X) | 12. (X) | 16. (X) |

✱ (4) Complete the following:

- Predation – predator – prey
- Commensalism – predation
- Producer – plant – decomposer
- Sun – consumer
- Genetic
- Cytoplasm – nucleus
- Chromosome – chromatid – centromere
- 46
- DNA – Histone
- Enzyme – chemical reaction - protein
- Lose – gain
- Evaporation – condensation – boiling
- Gravity – groundwater
- Desalination

✱ (5) Give reasons for:

- Because the horse is a herbivore that uses its incisors to cut plants, while the lion is a carnivore that uses its sharp canines to tear the prey.
- Because it exists in the form of two strands twisted around each other, forming a double helix.
- Because the trait of hair colour is transmitted from parents to offspring without learning.
- Because it needs to be learned and not transmitted from parents to offspring.
- Because bears feed on plants and animals (meat).
- Because the heat of the sun causes water to move from the Earth to the atmosphere, while the gravity of the Earth causes the water to return back to the Earth again.
- Because they can make their own food through the photosynthesis process.
- Because they consume feed on remains of dead bodies.
- Due to their feeding on aphids insects, which are considered one of the agricultural pests that harm vegetables and fruits.
- Because the bean plants obtain the nitrogenous materials from the root nodular bacteria while the root nodular bacteria benefit by obtaining their food from the plant.
- Because the trait of eye colour is transmitted from parents to offspring without learning.

❖ **(6) What are the results of each of the following:**

1. Water will evaporate and converted into water vapor
2. The autotrophic organisms (producers) will be unable to make their own food through the process of photosynthesis.
3. The bodies of the dead organisms will accumulate without decomposition causing significant harms to all other living organisms, thereby impacting the continuity of life.
4. It forms snow or hail.
5. The primary consumer will die
6. This affects the remaining individuals of the food chain or the food web, leading to a disruption of this ecological balance or even its destruction.
7. This leads to a decrease in the numbers of the producers and an increase in the numbers of the secondary consumers.
8. This results in an increase in the numbers of the primary consumers and a decrease in the numbers of the tertiary consumers.
9. He will feel crampy and other painful symptoms.

❖ **(7) Correct the underlined words :**

- | | | | |
|-----------------|------------|------------------|-----------------|
| 1. Prey | 5. Energy | 9. Condensation | 13. Evaporation |
| 2. Competition | 6. Nucleus | 10. Freezing | |
| 3. Photosystems | 7. Mendel | 11. Condensation | |
| 4. Decomposer | 8. Enzyme | 12. Evaporation | |

❖ **(8) Problems:**

1. 2
2. Bird
1. Predation
2. Benefit: chameleon – Harmed: fly
1. Commensalism
2. Bee
1. A – C – J
2. H – D – B
3. D
4. G
1. Predator
2. Predator
3. Condensation
4. Predator
5. Commensalism
6. Predator
1. B
2. A
3. D
4. C
1. Melting
2. Evaporation
3. Condensation
4. Freezing

كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9

